Historic, Archive Document

Do not assume content reflects current
scientific knowledge, policies, or practices.

1.6
So 35
Cop. 4

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / August 1974



OCT 22 '74
PROCUREMENT SECTION
CURRENT SERIAL RECORDS

Advocacy and the Service

We talk a lot these days about furnishing *facts* to people. Facts about soils. Facts about erosion control. Facts about land use. The idea is that, armed with enough facts, people will make informed choices among various alternatives.

But let's not forget that the Service has always been more than a fact-gathering agency. We were born and bred on advocacy. Beginning with our first Chief, Hugh Hammond Bennett, who was personally convinced that the economic health of this nation grows from "good soil used intelligently," to the modern district conservationist preaching the virtues of minimum tillage, SCS has always taken strong positions.

We have been *for* conservation of soil and water. We have been *for* the stewardship of our resources. We have been *for* flood prevention and the enhancement of fish and wildlife habitat. We have been *for* the use of soil surveys in land use planning.

The organization that gets things done, and that wins the support and respect of other Americans, is the organization that is not afraid to advocate its cause in a strong, clear voice.

Today, in addition to our longtime positions of advocacy, we are responding to newer concerns. One of these is noted in the Secretary of Agriculture's Memorandum 1827 which states, among other things, that the Department of Agriculture will help to enhance and preserve prime agricultural, range, and forest lands.

There are serious problems to many segments of society if prime farmland is gobbled up indiscriminately for use in suburban and industrial development. The amount of prime farmland available for many crops is limited. And if sufficient prime agricultural land is not maintained in production, the effect on food prices and the general economy can be significant.

Land owners and operators and rural and urban governmental bodies make the ultimate decisions on land use, as they should do and will continue to do. But it is well within the purview of SCS responsibilities to advocate viewpoints or actions that are clearly consistent with our mission. We are a major action agency in the natural resource field, and we cannot act—or help others to act wisely—if we remain quiet when issues of vital concern to conservationists arise.

The Soil Conservation Service will continue to provide resource data and other help in the most impartial manner possible. And we will continue to speak up—to be an advocate—when, by virtue of our particular expertise we can make a direct contribution to solving some of today's concerns. Anything less is an underutilization of our knowledge and experience.

Kenneth E. Grant

SOIL conservation

August 1974, Vol. 40, No. 1

Contents

2 From the Administrator

4 SCS and the oil shale program
by M. D. Burdick

7 Wet, wild spring in Iowa
by Lynn Betts

9 Good news for Louisiana wildlife
by Gene Warren

10 Helping small town Maine
by Vincent J. Price

12 What about plastic tubing?
by Elmer L. Barker

14 Green plants keep gold a'coming from California's foothills
by W. Curtis Sharp and Clarence U. Finch

16 Plant materials and waste management
by Donald H. Fulton and Glen L. Nielson

19 Progress in stabilizing manganese mine spoil
by H. Wayne Everett

20 New version of multiflora rose?
by Diana Morse

21 Recon

22 Soil surveys

23 Meetings

COVER: Mulching and preparing processed shale plots for revegetation. (See "SCS and the oil shale program.")

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture.

KENNETH E. GRANT, Administrator, Soil Conservation Service

CAROLYN M. JOHNSTON, Editor

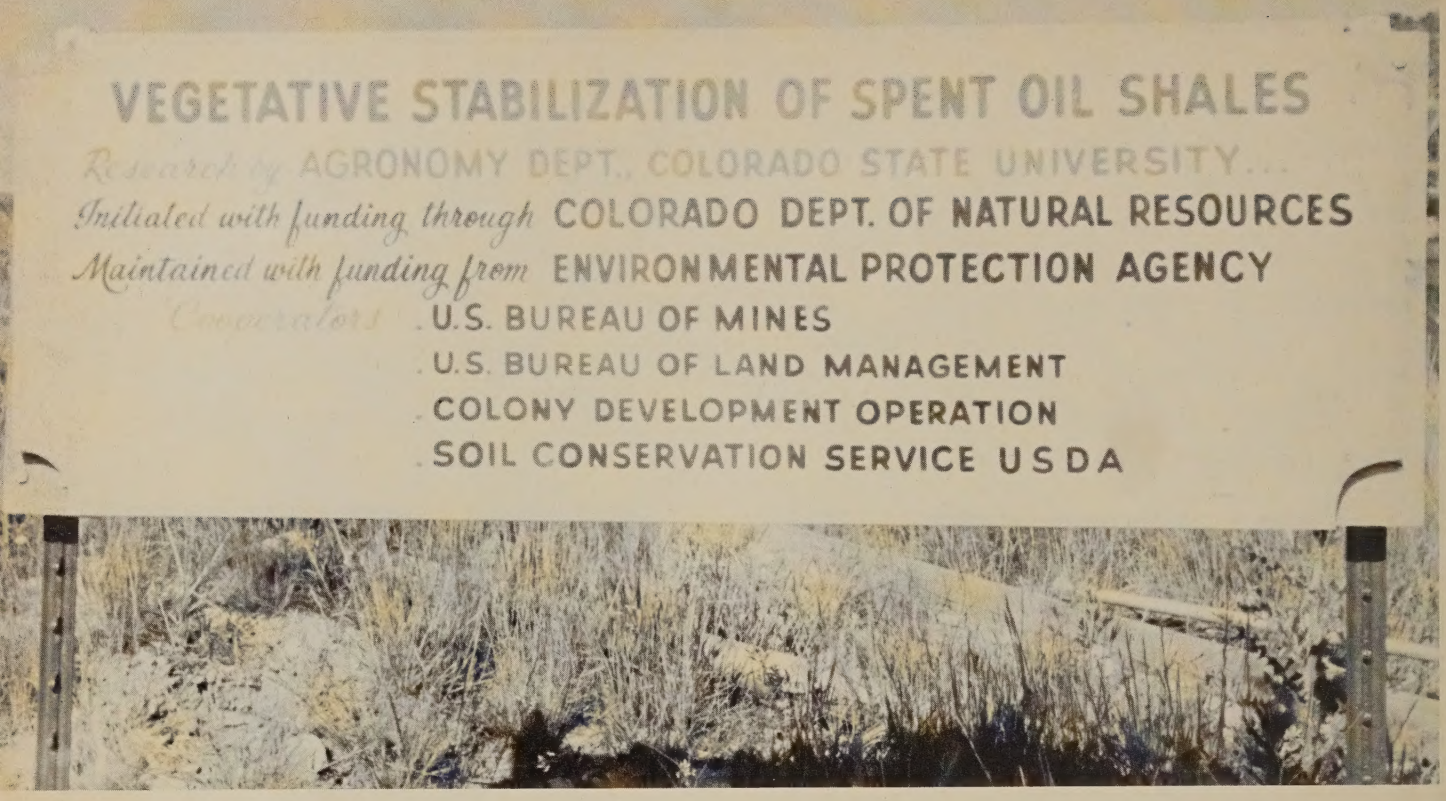
MARYELLEN BERTRAM, Editorial Assistant

SOIL CONSERVATION, the official magazine of the Soil Conservation Service, is published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Reprint permission: Contents of this magazine may be reprinted without permission. Credit is not required but is appreciated. Photographs are available on request.

Commercial names: Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscription: $5.65 per year, $7.10 foreign. Single copy, 50 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.



2,000 billion barrels

SCS and the oil shale program

by M. D. Burdick
State conservationist, SCS
Denver, Colorado

The Green River Formation in eastern Utah, northwestern Colorado and southern Wyoming contains about two trillion barrels of oil, of which approximately 600 billion barrels are recoverable with present technology.

Oil shale deposits of commercial interest underlie an area of approximately 25,000 square miles. Shales yielding an average of 25 gallons a ton occur in deposits that vary in thickness from 10 to 2,000 feet.

Approximately 80 percent of the richest oil shale deposits of the Green River Formation are located in the Piceance Creek Basin of northwestern Colorado. They contain an estimated 480 billion barrels of oil. About 72 percent of these deposits occur beneath public lands administered by the Department of The Interior.

In 1971, the Interior Department announced the Prototype Oil Shale Leasing Program whereby six tracts of public land, each containing 5,120 acres, were leased by competitive bid for commercial development.

Colorado, Utah, and Wyoming each contain two of the leased tracts. The total leased area is approximately 0.5 percent of the commercially valuable oil shale deposits. Further leasing will depend upon industry's ability to develop oil shale without unacceptable detrimental effects to the environment.

Background

The Prototype Oil Shale Leasing Program was preceded by intensive state-directed stud-

ies on the environmental impact of oil shale development and the costs of appropriate environmental controls.

In Colorado, the Governor's Committee on Oil Shale Environmental Problems (COSEP) includes representatives from state and federal agencies and private groups and companies.

The Governor's committee is segmented into four subcommittees, each dealing with a major environmental concern —water, resource inventories, revegetation and land rehabilitation, and the socio-economic aspects of oil shale development. The subcommittees are charged with the responsibility of identifying research needs, formulating research programs, and selecting contractors to carry out the needed research. Steering committees will guide and monitor the work.

From the beginning

Soil Conservation Service people in Colorado have been deeply involved in the revegetation and land rehabilitation aspects of the oil shale program. Colorado State Resource Conservationist E. F. Sedgley was assigned the primary responsibility for SCS participation.

Sedgley has been a member of the Governor's subcommittee for revegetation and land rehabilitation since its formation in 1970. For the past year, he has been the subcommittee's chairman, as well as chairman of the steering committee which directs the research program by Colorado State University.

In 1971, Sedgley became the Department of Agriculture's field representative on the Federal Oil Shale Task Force where he served on all major committees including the tract selection committee, lease stipulations committee, and the committees that prepared environmental impact statements for the prototype program.

When Interior Secretary Rogers C. B. Morton and his staff toured the oil shale region in 1971, Sedgley served as the Secretary's technical advisor for revegetation. In 1973 he received an official commendation from the Secretary.

SCS people have also worked with private companies. The Colony Development Operation of Atlantic Richfield Oil Company has invested several million dollars in oil shale related environmental studies. As a cooperator with the Bookcliff Soil Conservation District, the company received technical assistance from SCS on plant materials for revegetation as well as more general natural resource information.

The mining process

There are three possible ways to process oil shale:

- open pit mining
- room and pillar underground mining
- in-situ mining.

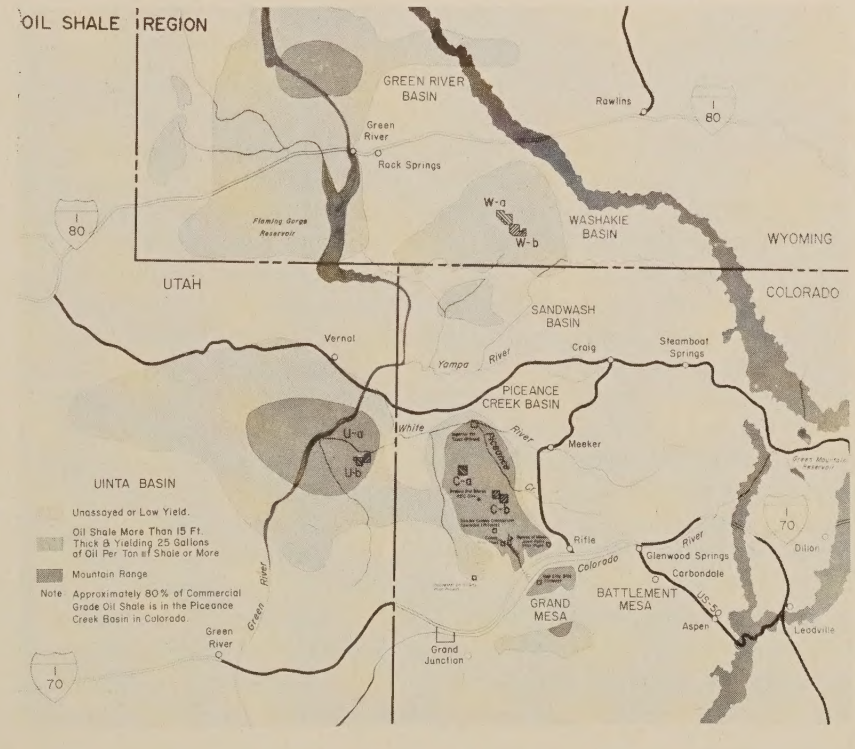
The first two require removal of the oil shale to above ground retorts where the organic compound is removed by volitalization at temperatures of around 900° F. In-situ mining is accomplished by heating the oil shale underground and pumping the shale oil to the surface.

At present, it appears that above ground retorting will be practiced on nearly all of the proposed mining sites. At least one site in Colorado will be partially mined by the open pit method.

There will be at least two major types of revegetation and land rehabilitation problems connected with the mining process: disturbed areas caused directly or indirectly by mining operations, and the disposal of mining waste materials.

Changes

If present development plans are followed, the number of people living in the oil shale region may double in the next 10 years. Land will be greatly



Map of the oil shale areas in Colorado, Utah, and Wyoming.

altered as new plants, new towns, railroads, highways, utility corridors, and other facilities follow people and mining into the area. It is extremely important that planners do a good job in selecting new areas and planning for their development.

The Department of The Interior stipulates that oil company lessees must make extensive baseline natural resource inventories, monitor environmental conditions, and restore environmental values to a level at least equal to those existing before development. Among other specific requirements, the lessees must have an SCS-type soil survey of their area and an inventory of the present vegetation.

Afterwards

Altering a region to accommodate new people and land uses is a major challenge to planners. But stabilizing waste disposal sites may be even more difficult.

A 100,000-barrels-of-shale-oil-a-day operation will produce about 20 billion cubic feet of spent shale residue over a 20-year period. This would fill a canyon 10 miles long, 2,000 feet wide and 200 feet deep. In terms of material removed, the proposed oil shale development will be the biggest operation in the world.

Spent shale material varies somewhat depending upon the system of retorting. It is generally a black carbonized material very high in soluble salts and devoid of basic plant nutrients such as nitrogen and phosphorus.

The spent shale material will support a variety of plants if it is leached, mulched, fertilized, and irrigated.

SCS and other agencies and groups are making field evaluation plantings on areas of pure spent shale, half shale and half soil, and areas where the original soil material has been only slightly disturbed. Early indications are that the slightly disturbed areas are easily revegetated, the half-and-half areas are moderately successful, while—as expected—without intensive treatment most plantings on spent shale areas alone have not survived. Work is underway to test a variety of plant species that may be more adaptable to growth on the spent shale material.

Many groups are involved in field test plantings. The Service has provided plant materials to oil companies and Colorado State University for use in their research projects. In addition, several extensive field evaluation plantings have been established by SCS to test a variety of plants for adaptability to special site conditions resulting from oil shale development.

SCS is the primary group field testing plants that will grow without irrigation. We are particularly interested in learning which plants can grow successfully under "natural" conditions, for example, plants that will survive without major assistance from man after he leaves the area.

As the program evolves and needs are identified, demands for SCS assistance will continue to increase.

Soil surveys and range site and condition surveys are emerging as required baseline data for inventorying and monitoring environmental values. The range site concept of SCS is popular with environmentalists and wildlife interests because it identifies not only the present plant communities but also the potential ones.

Due to past grazing use, much of the oil shale area is presently occupied by plant communities producing only half or less of the site potential. On some sites, plant communities below the potential are desirable if they produce browse plants needed by game animals.

Much of the oil shale land is used by wildlife. For example, the Piceance Creek Basin—where 80 percent of the richest oil shale deposits are located—is the wintering range of the

continued on p. 18

SCS assistance to people and agencies involved in the Prototype Oil Shale Leasing Program includes:

—Soils information. Provides baseline data on the land, and is used to help select the best areas for mining operations, new town areas, related facilities, and revegetation potentials.

—Range site and condition surveys. Identifies present and potential vegetative plant communities of the area. Indicates what will grow, which in turn determines which wildlife are attracted to the area.

—Help in establishing good conservation practices on mined land. This might mean limiting the steepness of the slope, stockpiling topsoil for later return, adding dams or other water diversions.

—Help in stabilizing oil shale waste disposal sites.

—Help in testing, selecting and planting the most desirable shrubs, forbs, trees, and grasses in an area, taking into account the planned land use and special problems such as accelerated erosion or difficult climatic conditions.



Wet, wild spring in Iowa

by Lynn Betts
Information specialist, SCS
Des Moines, Iowa

This spring, Iowa suffered the worst erosion it's had in almost 25 years.

A survey by the Soil Conservation Service in Iowa shows that about 4½ million acres of the state's 20.7 million acres of corn and soybean land suffered severe erosion—a loss of more than 10 tons an acre. Another 1.1 million acres of land were flooded.

Farmer Bob Bruxvoort of Jasper County, Iowa, had 250 acres of cornland flooded twice this spring. Here, he and his wife Jan clean out sediment from a drainage ditch.

Estimates by SCS field offices indicated 570,000 acres of cropland won't be producing a crop at all this year because of severe erosion or flooding, and another 1.5 million acres of cropland will yield no better than half the normal crop.

More than a third of the state has been declared a disaster area because of floods, severe thunderstorms, and tornadoes. Soil losses of 40 to 50 tons an acre were not uncommon, and some areas reached 200 tons an acre.

"Thunderstorms seemed to be continuous in Iowa in May and June," reports Wilson Moon, State Conservationist. "And they came just when fields were worked up for planting or freshly planted. That's the worst time of year for them to come."

Besides the loss of irreplaceable topsoil, seed was washed out, fertilizer was lost, crops were covered with mud, ditches and waterways were plugged or washed out, and more sediment washed into rivers, lakes, and reservoirs.

Despite the devastating soil losses, there were signs of encouragement. Soil conservation practices paid off. Farmers who

left a good cover of cornstalks and other crop residues on the surface stopped erosion on gently sloping land. Howard Elson, who farms in Jasper County in central Iowa, noticed a big difference between his plowed land and his conservation (minimum) tilled land. "We got erosion on our plowed land, and it's only 3- to 5-percent slope. It was a different story on about a third of our corn ground, though. We left about all the cornstalks on top of the ground on it, and didn't get any erosion."

Elson explained he switched to conservation tillage (two diskings rather than plowing) on a third of his corn land in 1973 because it was too wet to plow. He says this gave him his best stand of corn with the least work, so he did it again this year. He plans to switch to conservation tillage on his other land, because it's cheaper, saves time and energy, and stops soil from washing and blowing.

On longer slopes, many farmers found that terraces did a good job of holding back water. Robert Smith of Fremont County in the southwest part of the state says his terraced field withstood a 3-inch rain, that fell in 40 minutes, with little damage.

"They weren't built for this kind of rain, but they held pretty well," Smith said. "The hill was a sheet of water, and the terraces looked like they filled up right away. I got a little erosion between them, but not nearly as much as I've seen in fields close by that weren't protected."

"This spring's storms sold many people on conservation tillage and terraces," SCS State Conservationist Moon reports. "Some farmers are even building terraces this year in bean and corn fields. That destroys some of this year's crop, and farmers wouldn't ordinarily do that unless they figured it was important."

The large scale erosion in Iowa also prompted more people to seriously consider long-term agreements for cost sharing on soil conservation practices. "Those who had only part of their farm controlled could see they needed more protection, and are eager now to get conservation on the entire farm," Moon said.

According to the 1967 Conservation Needs Inventory, only 47 percent of Iowa's cropland is adequately treated against erosion. So, there's still a tremendous job to do. While the erosion losses this year will be hard to overcome, they may give added incentive for conservation work in the future. ♦



These Page County tile outlet terraces did a good job of holding water back after a 3-inch rain fell in 40 minutes. Crop residue on the surface also helped reduce erosion.



Accent on acorns. Mrs. Don Page harvests her "crop."

Good news for Louisiana wildlife

by Gene Warren
Information specialist, SCS
Alexandria, Louisiana

Acorns aren't just for squirrels—not when you can get upwards of $25 a bushel for them.

That's what's happening in the South where sawtooth oak trees—native to the Far East—are being introduced as a food for squirrels, deer, and other wildlife.

It started back in the late 1950's when the Soil Conservation Service Plant Materials Center in Georgia decided to see how these plants would adapt to conditions in the South. The Center supplied the first sawtooth oaks to soil and water conservation districts which arranged for local farmers to try them out on a volunteer basis.

Today, acorns from these trees are being shipped around the South for plantings on both public and private lands to attract wildlife.

One of the early areas where these trees were grown is now the Don Page farm in Vernon Parish, Louisiana. The Pages have 37 of the original trees planted in 1961 on about half an acre of their 20-acre farm. These trees were provided through the local Calcasieu Soil and Water Conservation District.

Last year, the Pages harvested their biggest crop.

"We picked and sold 13 bushels," reports Mrs. Page. "We asked $25 a bushel and got it. The acorns may be worth more but we had no idea how to sell them."

Some of the acorns were sold to the SCS in Jackson, Mississippi, to produce more seedlings in the South. The rest were shipped to landowners in Louisiana, Texas, and Arkansas.

From 1967 to 1971, the Pages gave away most of the acorns from their trees. SCS collected some for the Louisiana Forestry Commission to grow seedlings, the Louisiana Wildlife and Fisheries Commission used them in wildlife management areas, and many individuals collected them to plant on their own land. They are often grown along fence rows, drains, or in open areas of woods.

"We hope to keep the acorn project going and plant more acorns for seedlings," Mrs. Page said. "It seems that more and more people are becoming interested in wildlife and want to provide food and homes for them."

One of the bonuses of these trees is that they produce acorns much sooner than native oaks—at 6 to 10 years of age compared with 20 to 25 years for native oaks. Growth is relatively rapid. The 12-year oaks of the Pages now average about 40 feet in height and 8 to 10 inches in diameter.

Mature oaks usually grow to a height of 80 feet and will bear about 50 pounds of acorns a year—a pound equaling 40 to 80 acorns, depending on size. The trees do best on moist, well-drained sites and should not be planted in areas that flood frequently. ♦

Helping small town Maine



Planned development is as important to the small towns of America as it is to the great metropolises. Economic, cultural, and environmental losses may, in fact, hurt people in small towns more than city dwellers.

But while many major cities have full-time departments of planning and zoning, complete with computer banks and experts in half a dozen different fields, the small towns seldom have the facilities even to begin a comprehensive plan. Although the U.S. Department of Housing and Urban Development (HUD) will cost-share for planning work, the local cost is often more than a small town can bear.

Until recently, few of the 74 municipalities in the St. John-Aroostook Resource Conservation and Development Project (RC&D) area in northern Maine could take advantage of the HUD program. Only eight communities in the project area had a population of more than 2,000 people and 57 of the municipalities had less than 1,000 residents. Few had full-time town managers. Few had planning boards or access to the necessary expertise for comprehensive planning.

Today, that's changed. An unusual program based upon a very high degree of interagency cooperation is providing small communities in northern Maine with a team of technical experts to help them with their planning efforts.

The Small Community Planning Team meets monthly to coordinate its joint efforts. There are 35 members of the basic team — assisting the Northern Maine Regional Planning Commission, the RC&D project, the Soil Conservation Service (representing the three conservation districts in the project area), the Maine Bureau of Forestry, the Cooperative Extension Service (CES), the Office of Economic Opportunity (OEO), the Maine Department of Inland Fisheries and Game, and a consulting engineer chosen by the town. The team is chaired jointly by community planner Jerry Bohinski of the planning commission and Extension Agent Tom Sweetser, assigned to the St. John-Aroostook RC&D.

Each agency involved has its particular area of expertise. As a team, they offer a unified approach to comprehensive planning. Generally, the team works like this:

The Economic Planning Division of the Regional Planning Commission studies the population trends and characteristics, as well as regional and community economies.

The St. John-Aroostook RC&D, SCS, and state forestry people determine the physiographic features, soil characteristics, and land use capabilities of the area.

The community itself is studied by CES, the local planning board, OEO, and other community action agencies to

by Vincent J. Price
Information Division, SCS
Washington, D.C.

determine housing problems and needs and what must be done to correct substandard conditions.

CES and the local planning board also study the location and fitness of municipal buildings and facilities. With help from other social service agencies and depending on the particular needs of a certain town they sometimes study home and family service needs as well.

Several agencies survey the town's water and sewer needs, as well as consulting engineers hired by the town. The Regional Planning Commission's Law Planning Division can spotlight any problems needing attention in law enforcement and protection.

Additional experts join the team as needed. For example, the Maine Departments of Commerce and Industry, Environmental Protection, and Health and Welfare have participated.

When the research is completed, the Regional Planning Commission writes a summary of problems and recommendations. The town planning board and town selectmen arrange the problems in order of town priorities. Based upon these priorities, an action plan is developed by the entire Small Community Development Team, working with all other agencies involved in that town's plan. The priority action plan contains recommendations for implementation, the estimated costs of various projects, and suggested sources of assistance.

The plan itself is carried out by the selectmen and town planning board who work out a timetable based upon their budget.



Thomas Sweetser

"The Planning Commission, the Cooperative Extension Service, and the Soil Conservation Service provided the original stimulus for the team in 1968, but it quickly broadened and expanded from there," explains cochairman Tom Sweetser of CES. "When we first started, we were naturally thinking just about our own agencies and our own responsibilities, but as we worked together we came to understand the problems of the other agencies as well."

To alleviate possible tensions from interagency conflicts, the team called in a sociologist from the University of Maine. He interviewed each member individually, taped the interviews, and reported his findings. The team discussed the report and members say the nonpartisan views of the sociologist helped put interagency disagreements into better perspective.

The first town to develop a plan was Patten. S. Von Day, RC&D project coordinator, recalls that "the plan was worked out face-to-face with the other agencies, and it took some doing. There were some conflicts. But now, after several years, the team is really beginning to jell."

Work has speeded up since the Patten plan, as the team developed a structure and established a method of operations. Eight towns now have comprehensive plans, with nine more plans underway and 12 tentative starts scheduled.

Blaine is another town that has benefited. "You couldn't put a dollars and cents sign on the value of this to Blaine, it was so valuable," says Blaine Planning Board member Gordon "Red" Stitham. "The average citizen in these smaller communities doesn't understand comprehensive planning and we don't have the resources to do it all ourselves. These boys on the community planning team put us to work —and that was good."

Volunteers in Blaine collected a great deal of data. Sometimes it surprised them.

"You can live with something right under your nose and not realize it," says Stitham. "For example, we had a home survey and were surprised to discover the number of homes in a bad state of repair. We found homes where people had to carry their own water, and where there still were outhouses. There was one home with four people living in it, aged 79 to 85, and one of the women had to haul water from the well and then heat it on the stove to do the laundry. These were people who had built this country; it wasn't that they didn't want better things, but they were proud."

It took Blaine 16 months to complete a comprehensive plan. The town controlled the process. "The team had their suggestions," says Stitham, "but

continued on p. 20



What about plastic tubing?

by Elmer L. Barker
Soil conservation technician, SCS
Bellingham, Washington

A lightweight, flexible plastic tubing, installed by a laser beam-guided machine, is revolutionizing underground drainage in northwest Washington State.

There have always been problems in draining the flat, impermeable soils of this area. Until recently, most farmers used a combination of many open ditches and a few covered tile drains.

Open ditches were dependable but they cut farmland up into small, hard-to-work fields. The ditches needed frequent clearing, as well as fences to protect against livestock and bridges for moving farm equipment.

Covered drains were preferable, but they were more costly to install. Many farmers avoided them for this reason.

Today, however, new materials and installation methods are making underground drains more practical and more popular than ever before.

Early farmers in the area generally dug their ditches by hand. They filled the bottom with cobblestones, then covered them with soil placed over cut brush. These were called French drains.

A second method, used when there was plenty of good cedar timber in the Northwest, was to lay long split railings in separate but parallel rows on the ditch bottom. These were

bridged over with thick slabs of wood.

A third method became popular when sawed lumber was available to make box drains. These had openings along their length to collect water and were surprisingly durable.

In search of even more dependable drains, farmers turned to concrete and clay tile. They discovered early that concrete tiling would dissolve in the area's acid soils after a few years, so hard-baked clay became the accepted drainpipe.

Foot-length sections of clay tile were laid end to end in a continuous line, with water entering at each loosely butted joint. But there were problems. It was difficult to align the short, heavy tile correctly, and if even a single section rolled to one side during installation and back filling, the entire drain line could plug up. Boards with side cleats were sometimes laid beneath the tile to form a holding trough that would keep the tile correctly lined. Some manufacturers also made a hexagon-shaped tile to provide a flatter surface and better contact with the ditch bottom.

In some soils, filters were needed to keep sand from settling out and filling up the drain line. Gravel on and around the line was the best filter but it's expensive and difficult to haul and handle in wet fields. Wood shavings, sawdust, and chips were also used. Sometimes even old hay or leafless, small-stemmed brush was placed over a line to act as a filter.

Underground clay tile systems meant hard work and problems to many farmers. Often, they preferred the open ditches even though this left less land for crops.



Plastic tubing changes the picture. It comes coiled in 250 foot lengths weighing 70 pounds, and can be handled by one man. A similar amount of clay tile would weigh close to a ton!

Plastic tubing is durable. Some manufacturers claim it will last a century. The corrugated construction makes it strong and furnishes excellent areas for water intake holes spaced along the line. There is also a factory-installed continuous nylon filament sock to act as a filter against sand and sediment where this is needed in problem soils.

In 1971, dairyman Martin Vreudgenhil of Sumas, Washington, decided to use the new plastic tubing to drain 180 acres of his flat Puyallup and Sumas silty loam soils. Better drainage meant he could get his cows and farm equipment onto the land as needed. Also, he wanted to reduce the amount of fertilizer runoff from his pastureland.

Vreudgenhil couldn't get enough plastic tubing locally, so he sent a truck straight to a California factory for a full load. He had no tube-laying machine, so he hired a Canadian contractor to install his first 13,500 feet of drain.

Since then, a number of Vreudgenhil's neighbors have put in plastic drainage systems and one man—Bill Stensland—has bought a laser-guided machine to do the tube-laying job.

The job begins with a topographical survey of the area to decide on the length, depth, and suitable grade of the pro-

continued next page

(Far left) Trencher in operation.

(Near left) Bill Stensland at controls of laser gun.

posed drainage line. This predetermined gradient is set into the laser-beam projector which is stationed at, or slightly beyond, the drain outlet.

The laser-guided machine provides for great accuracy, so tubing can be placed on the grade desired. One operator can put in a mile of drain a day, even on difficult terrain such as swampland or mudflats.

The projector for the machine is powered by a six-volt wet-cell battery similar to the ones in automobiles. The battery not only powers the laser but energizes a miniature motor that swings the beam on a 30-degree arc. Within this area, the machine can turn at will while still maintaining the exact grade. This is important; a sag or hump in a line can cause sediment to settle out and restrict water flow.

A few hours after plastic tubing has been installed water will run almost crystal clear out of the new drain. There will be little sediment; even manure, fertilizer or herbicides spread on the land are filtered through two or more feet of soil before they reach the drain.

With modern trenching machines there is little disturbance of topsoil. Dirt removed during the digging is routed around and right back into the ditch itself without touching the cropland on either side.

By contrast, older methods of trenching piled excavated soil onto adjoining land, sometimes damaging crops. A separate operation was needed to return disturbed soil to the ditch.

Dairyman Martin Vreudgenhil is pleased with his 23,500 feet of new drains. He can get cattle and equipment out on his fields almost anytime he wants to—and forage production has jumped.

Neighborhood farmers have installed more than 160,000 feet of plastic tubing. And nonfarmers use it too. Nearby Blaine High School has installed an extensive grid of underground plastic tubing drains to dry out their waterlogged football field and playground.

Farm or football field—at work or play—new methods of drainage are helping people use their lands more efficiently. ♦

GREEN PLANTS KEEP GOLD A'COMING FROM CALIFORNIA'S FOOTHILLS

by W. Curtis Sharp
Plant materials specialist, SCS
Lockeford, California
and Clarence U. Finch
Conservation agronomist, SCS
Fresno, California

There's still gold in California's hills—but there are problems as well.

The booming orchard and vineyard industry in California has caused growers to head for the Sierra Nevada foothills. Climatic and soil conditions are favorable, but a major enemy haunts their every move: Soil erosion.

The sloping hills of the Sierras, laid bare of protective cover, invite ecological disaster. Soil losses of up to 300 tons an acre have been recorded. And farming methods brought from the flat lands, such as maintaining weed free conditions, further compound the problem.

Cover crops have been used in California's orchards and vineyards for over 70 years. Their value in improving water penetration, controlling erosion, and reducing soil compaction is well documented.

Their use today, however, frequently is dependent on how well they fit into modern orchard and vineyard technology. Some plant species used in the past, like mustard or sundangrass, complicate modern tillage, irrigation, and harvesting practices.



Growing trees on weed-free bare ground, while acceptable on level land, can mean severe erosion on sloping orchardlands.

To overcome this problem, SCS conservationists in California were faced with developing an effective cover crop system that would fit into present and future orchard and vineyard operations. We had to take into account the fact that plants useful under one set of conditions could be a liability under other circumstances.

In the late 1960's, the SCS Plant Materials Center (PMC) in California selected grasses and legumes as having potential cover value for hilly areas. Only a few had previously been used in orchards or vineyards. Some were dryland range plants, others were primarily used in irrigated pastures. They were produced at the PMC and made available for field tests.

SCS soil conservationist Gibbons Moore, working with Pond Poso Resource Conservation District (RCD) cooperators, located several test sites on orchards and vineyards. Other evaluations were also made in the Patterson and Navelencia RCDs with the help of district conservationists Eldon Glenn and Morris Martin. A total of 115 plantings were made in a 5-year period in eleven resource conservation districts.

As usual, some plantings proved successful and some did not. From these results, we have prepared recommendations for plants and their management for the wide variety of circumstances experienced in California.

The most versatile cover crop system proved to be "strip management." The cover plant is grown and managed in strips between the vine or tree rows.

Restricting the ground cover to an area between rows reduces many previous objections to cover crops, while at the same time it utilizes most of their advantages. The vegetative growth can be controlled by mowing. This reduces the danger of frost damage and the amount of residue buildup; the latter problem can complicate harvesting. The amount of vegetation can be manipulated to reduce its competition with the tree or vine for nutrients and moisture. In addition, mowing consumes less fuel than cultivating.

One of the most successful cover plants is Blando bromegrass, an annual originally selected for its use on California's rangeland. It can tolerate close clipping for residue and frost control, yet produce a dense and deep root system. It perpetuates itself by reseeding.

With an improved arsenal of cover crop plants and better technology for their use, the gold in California's foothills can keep on coming. ♦

Plant materials and waste management

by Donald H. Fulton
State range conservationist, SCS
Boise, Idaho
and Glen L. Nielson
District conservationist, SCS
Caldwell, Idaho

What do you do with a continuous flow of thousands of gallons of water per minute containing high caustic soda and potato peelings?

Recycle and use it for irrigation water. That's what the J. R. Simplot Company is doing at their Caldwell, Idaho, plant where several thousand tons of potatoes are processed daily into french fries for distribution nationwide.

Under the guidance of James Oates, director of environmental affairs for the Idaho firm, a unique system has been devised to recycle waste water from the operation. It is used to irrigate about 850 acres of land which grows feed crops for the company-owned feedlots. It provides for almost total utilization and zero discharge of waste water.

"I don't want to give the impression that all of our problems are solved," says Oates with a smile, "but we have come a long way. And we're getting more efficient every year.

"Our real challenge was to balance the water and crops on a year-round basis. A farmer doesn't irrigate in the winter, and he isn't concerned when ordinary water runs off his fields. But we have to use all of the water 24 hours a day, every day of the year, and maintain total retention on our land."

When the potato processing plant began primary treatment operations in 1964, five large earth reservoirs covering 30 acres were used to contain the water for treatment. The treated water was discharged into the nearby Boise River.

In 1967, Oates working with the general manager of the feedlot and farm operation, began a pilot "land disposal" program to test the effectiveness of using the waste water



(Left) Latar orchardgrass is mowed, windrowed, and left to partially dry for a few hours before being chopped and fed to cattle. (Right) These steers eat chopped hay from fields irrigated with plant waste water.



for irrigation. He also launched a search for suitable crops that would tolerate these conditions.

That's when the Soil Conservation Service and the Canyon Soil and Water Conservation District were asked to make a study of the soil infiltration rates and determine which types of forage would be best adapted. Forage trial plots were developed which included a wide variety of grasses and legumes. Latar orchardgrass and creeping meadow foxtail responded the best.

Then an extensive improvement program began. Currently, some 850 acres have been leveled, planted and put under irrigation. This necessitated lining 25,000 feet of canal with concrete, installing 4,200 feet of underground pipeline, completing two tailwater recovery systems (one remains to be installed), constructing a quarter mile of new drain, and improving about 3 miles of old open drains. SCS served as consultant to the private engineering firm which designed the system.

In 1969, a "dry peel" process was installed, resulting in a drastic reduction in water usage. This new method of peeling potatoes decreased the amount of water needed from 5,000 gallons per minute to 3,500 or less. In addition, less caustic soda was needed.

Today, from 10 to 12 feet of water are applied to each acre every year, more than twice the average for nearby farms. Fields are irrigated every 6 to 8 days during the hottest part of the summer. If the plant is closed for vacations or repairs, water from the company-owned wells is used.

If excess water reaches the lower end of any field, it drains into a specially designed collection system which pumps it back to the top of the field. By this method, all the water remains on company land.

According to Oates, the water leaves the plant at a temperature of 75° to 80° F., and is very high in nitrogen. "It's this combination of warmth and nutrition," he says, "that makes it possible to harvest six cuttings per year from the grass crop, with an estimated production of around 8 tons of dry forage per acre." The average hay crop in the area is 4 tons.

It is estimated that 800 pounds of nitrogen per acre are applied to the soil each year through the waste water irrigation process. The harvested forage contains from 14 to 18 percent protein.

The grass crop is green-chopped and mixed with other rations, including the waste potato which is separated from the process water. It provides partial feeding for approximately 26,000 yearling steers.

"Getting established the way we are today has been very expensive," Oates states, "but we feel that every dollar spent will pay in the long run. Last year a pipeline cost us $100,000, but it permitted us to apply our wastes to another 350 acres."

After 1974 most of the construction will be completed and then more effort will be directed to refining and improving the present system.

"Our operation now has what you might call a self-contained recycling system," comments Oates. "The wastes from the processing plant either feed the steers directly or supply nutrients for grass which feeds livestock. In turn, the wastes from the livestock feeding pens are applied to the fields to produce more forage."

Oates notes that his company has faced some new problems in getting the system established. "Our grass is still green and growing during the winter when everything else is covered with snow and ice," he says. "One of our problems has been learning how to irrigate the fields during a snow storm!" ♦

largest migratory mule deer herd in the world. For this reason, the area should be revegetated to include native browse plants such as mountain mahogany, serviceberry, antelope bitterbrush, and four-wing saltbrush.

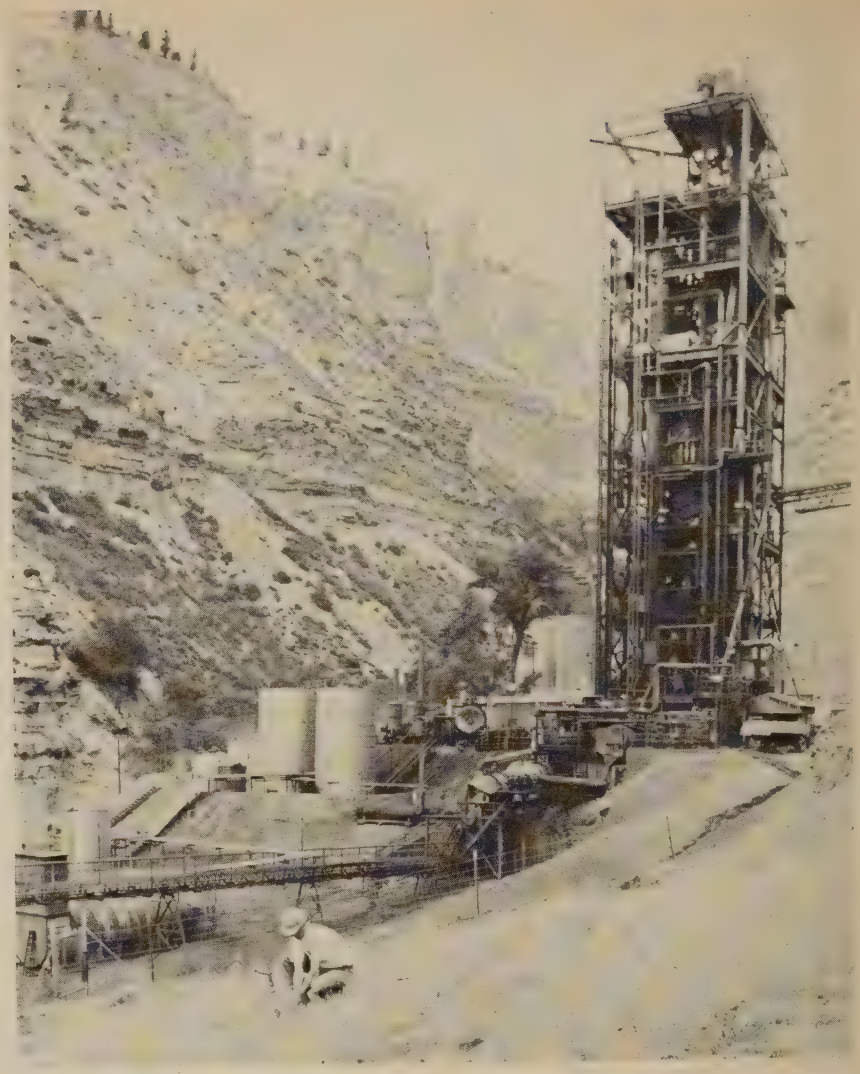
The problem here is twofold: native plants are not grown commercially in large enough quantities to replant whole mining areas.

And, as the land is mined, it changes to the point where many plants once native to the area are not adapted to the new soil conditions.

The SCS plant materials program can provide a major contribution. SCS plant materials specialists can help to supply needed species to commercial growers and can work to develop new varieties to meet changed conditions of the land. The special technologies required are not generally available in other agencies.

With the national need for new energy sources, the development of oil shale fields appears to be inevitable. Everyone involved in the project is well aware that this will have a major impact on Colorado's environment.

SCS people are working with many other experts to help solve the complex problems arising from the extraction of this natural resource from the ground. We hope to continue using our special knowledge of soil, water, plants, and wildlife for the benefit of Americans and the American land. ♦





(Above) Colony's seven-story-tall retort uses heat-transfer principle to produce crude oil from crushed shale. A revegetation test plot is in the foreground. (Below) This truck hauls about 75 tons of raw shale from inside the mine to the primary crusher.

(Mining area pictures courtesy of Colony Development Corporation, Atlantic Richfield Company.)

Progress in stabilizing manganese mine spoil

by H. Wayne Everett
Plant materials specialist, SCS
Lexington, Kentucky

Stabilizing surface-mined land with plants is rarely easy, and Virginia's manganese mine spoil is one of the more difficult to reclaim.

But people have tried, at great expense, for many years. Some groups have spent more than $2,000 per acre for grading, adding topsoil, and making trial plantings on manganese spoil.

Soil Conservation Service plant materials centers have had more success with low-cost stabilization than most groups, although they have faced the same tough obstacles. These obstacles include high acidity (pH 3.8-5.4) and low nutrient content; manganese toxicity, which can destroy plantings or reduce their effectiveness in preventing erosion; and a soil so disturbed by mining that it is practically structureless, which causes instability and severe shrinking and swelling.

The nearly 400 acres of manganese spoil in Virginia's Evergreen and Skyline Soil and Water Conservation Districts illustrate the difficulty of revegetating the land. Even after 15 years there is little or no volunteer revegetation, and erosion is severe.

More than 50 species of trees, shrubs, grass, and legumes developed by SCS plant materials centers were planted on Virginia manganese spoil in 1960, 1961, 1962, and 1966 to evaluate their usefulness. Grass and legumes were seeded with and without mulch and lime. Herbaceous and woody plants were tested with and without fertilizer.

Of the 15 grass and legume species, those with the highest germination rates and best stand establishment had been both mulched and limed. But even good stands deteriorated quickly because the soil was so unstable it eroded away from the plant roots, exposing them to the sun and wind.

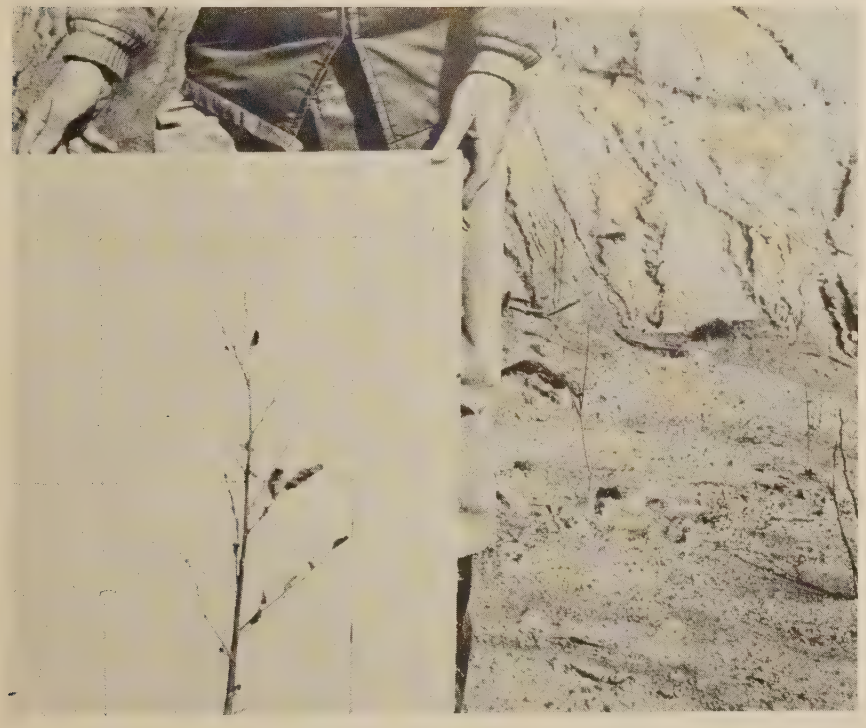
Frost heaving had the same effect. Freezing of the soil pushed the soil and plants up 1 to 2 inches; when the ice melted, the soil lowered again, leaving the roots exposed. All herbaceous plants established the first growing season eventually were destroyed or died.

Of the 19 shrub and 17 tree species planted, less than half survived the first year. Survival and growth were improved by the use of fertilizer. A slow-release fertilizer, acting for 8 to 12 months and composed of ammonium, potassium, phosphate, and magnesium, worked the best.

Trees and shrubs with the best survival and growth rates were European black and speckled alder, autumn olive, bristly locust, and black locust. At least 70 percent of these plants survived when the slow-release fertilizer was applied to the planting holes.

Pine species did not survive or grow well because they were blown over and exposed to the drying force of the sun and wind. Larch species survived well but have produced little erosion control litter on the soil surface.

continued next page



Alder plants at the end of their first growing season on manganese mine spoil. Squares on the white board are 12 inches tall.

Recent evaluations of 8-year-old woody species for vigor and growth show that European black alder, black locust, 'Arnot' bristly locust, 'Cardinal' autumn olive, and European and Japanese larch are best. The European black alder was the most successful.

On steep slopes, all plantings failed because the structureless soil eroded. Plantings on graded and leveled areas were successful if soil amendments and certain species of woody plants were used.

Based on these results, SCS plant materials centers can recommend specific plants to help stabilize at least some of Virginia's manganese mine spoil effectively and relatively economically. ♦

HELPING SMALL TOWN MAINE

continued from page 11

if we didn't agree with them, they were flexible and would bend to our wishes. There was no pressure put on us, and that was the greatest thing in working with these gentlemen. They weren't selling us a bill of goods. They're out for your community and the people in that community."

When the plan was completed, the town established its priorities. So far, Blaine has accomplished its first four goals, including the construction of a dam to provide water for fire protection.

Another benefit of the program has been greater cooperation between towns. "I've seen towns that I thought were never going to get along work together to solve problems," says Stitham. "It was the boys in the regional planning office, the Soil Conservation Service office, and the RC&D that showed us how to do it."

Extension's Tom Sweetser estimates that the job of preparing comprehensive plans for all 65 small communities in the program area will take another 10 years. He points out that "We don't do planning until there's enough local interest to move ahead. Currently we have about a dozen towns waiting to receive our assistance."

The planning effort costs slightly under $9,000 per town. RC&D funds pay $1,200 of SCS expenses and $2,000 of CES expenses. The Regional Planning Commission's expenses come to about $3,000. The other state and federal agencies expend about $2,000; and the towns lay out a few hundred dollars in cash in addition to their volunteer labor in data collection and surveying.

The plans are worth the expense. "I don't see how you could handle it any other way," says Kenneth Arndt of the Northern Maine Planning Commission. "This is planning that has got to be done."

As for Blaine's "Red" Stitham, he says, "I'm a great baseball fan. If I had a team, these are the boys I'd want on it. They don't come in and bully you. But they know what they're doing and they sure are efficient." ♦

NEW VERSION OF MULTIFLORA ROSE?

Plant scientists at the Soil Conservation Service's Plant Materials Center in Quicksand, Kentucky, are working to develop a multiflora rose that will not spread.

The selection they are working on, which was gathered in Ohio, blooms as freely as the current multiflora rose, but not as many blooms set on it, nor do as many mature. Those seeds which do mature have a low rate of germination.

Multiflora rose has been planted extensively in the United States over the past 25 years as a living fence for livestock, as food and cover for wildlife, and for beautification.

An important winter food for many song and game birds, it spreads through bird-carried seeds. Where conditions are particularly favorable to its spread and growth, it can be come a dominant pest. It has been declared a noxious weed in some states.

The spread can be particularly serious in wood borders, field hedgerows, and on crop and pasture fields that are either abandoned or receiving low-level management.

Multiflora rose is still produced in quantity by commercial nurseries and is still extensively used in some areas. It is because of its conservation value and the fact that it is still produced and used that SCS is searching for a multiflora rose that will not spread.

An Asian species, multiflora rose has been used in this country since 1800 as an ornamental and as a rootstock. Many of our best garden rose varieties are budded from it.—by DIANA MORSE, *information specialist, SCS, Washington, D.C.* ♦

36-24-36? How is American agriculture shaping up in the 1970's? The Bureau of the Census hopes to get all the vital statistics during the 1974 Census of Agriculture. The Bureau, which is part of the U.S. Department of Commerce, conducts the census of agriculture every 5 years.

Questionnaires will be mailed to farm operators the last week in December. To prevent questionnaires from getting lost with the Christmas wrappings, the Bureau plans an extensive publicity campaign. Radio and TV spots, newspaper and magazine coverage, posters, pamphlets, and celebrity endorsements will be used to alert farm operators to the questionnaires.

Statistics for counties will become available about November 1975 and for states about March 1976. The complete census will be published by September 1976, according to Bureau officials.

Scenic preservation hits the road. Quiet, tree-lined roads in Wisconsin may now be preserved in all their pastoral charm. The state has a new "rustic roads" law; municipalities can ask that roads or portions of roads under their jurisdiction be designated as "rustic roads" and restricted for pedestrian or bicycle use, or divided to separate vehicular, pedestrian, and bicycle traffic. Applications must be approved by an 11-member Rustic Roads Board in the state Department of Transportation. Under the program, participating communities may receive state aid.

Chicago sludge helps land. Chicago is shipping more than half its treated sewage sludge 200 miles down the Illinois River to Fulton County, where it is used to fertilize formerly strip-mined land.

The Metropolitan Sanitary District, which operates the land reclamation program, first treats Chicago wastewater by settling it through a heat process. Then the dry sludge is carried downriver by barge and pumped by underground pipeline into giant reservoirs. High-powered sprinklers spray it over the land.

About 1,700 acres of the land is planted to corn, soybeans, and other crops. So far, more than $400,000 has been returned to the Sanitary District from sale of the crops.

Conservation practices such as minimum tillage, land leveling, and runoff basins are important in the program. A control system checks the quality of surface runoff before discharge into natural streams and lakes. Monitoring wells check ground water quality.

Another 700 acres of land in the program is used for recreation. Included are 14 miles of hiking trails and several lakes for fishing.

Soil erosion is destroying Haiti, according to a *New York Times* story. Most of the topsoil is gone in this once productive country, now one of the poorest in the hemisphere, and floods and silt wreak havoc in the populous valleys. Since wealthy farmers own most of the valley farms, says the *Times*, the poorer Haitian peasants clear land for farms or cut wood for fuel on the steep mountain slopes, inviting erosion during tropical rains. Many mountaintops are already bare, and "the damage to agriculture and to the environment is incalculable." Reforestation is being tried, but in the words of one foreign aid official, "you can't take peasants off a hillside and tell them to go starve somewhere else."

Porous parking lots soak up rain. Parking lots paved with porous asphalt are being tested near Houston, Texas, and at the University of Delaware in Newark. The tests allow the rainwater to seep through and return to the water table below.

The porous asphalt is made of larger-than-ordinary rocks. Rainwater passes through the small holes or "pours" between the rocks.

Rocks and sand under the asphalt form a reservoir capable of storing 5 inches of rain until it either percolates into the soil or is carried away by subsurface drainage.

Franklin Institute Research

Laboratories of Philadelphia developed the porous material and will collect and check data on the test lots.

Slag used for shoreline erosion control. Baltimore County, Maryland, recreation and parks officials have used slag from a steel plant as fill to control shore erosion and reclaim land along the Chesapeake Bay. Slag is placed along the shoreline to a depth of 6 feet and a thickness of 4 feet. Clay and sand are then piled on top of the slag. This helps prevent erosion caused by tides, motor boats, or floods.

Recreation and parks officials say over 400,000 square feet of land have been preserved or reclaimed with slag so far. The cost is said to be 80 to 90 percent cheaper than conventional bulkheading material such as stone or concrete block.

EPA sounds off on noise. EPA intends to propose noise control standards for two major noise producers: trucks (medium sized and heavy duty) and air compressors. The agency has also listed 20 other candidates for noise standards, including such ear-splitters as dump trucks, jack hammers, pile drivers, snowmobiles, concrete mixers, pneumatic tools, and trail bikes.



Soil surveys

California

El Dorado Area. By John H. Rogers. *1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 89 pp., illus.; maps.*

Delaware

Sussex County. By William Ireland, Jr., and Earle D. Matthews. *1974. Soil Conservation Service in cooperation with Delaware Agricultural Experiment Station. 74 pp., illus.; maps.*

Georgia

Bryan and Chatham Counties. By Robert L. Wilkes, J. H. Johnson, H. T. Stoner, and D. D. Bacon. *1974. Soil Conservation Service in cooperation with University of Georgia Agricultural Experiment Station. 71 pp., illus.; maps.*

Illinois

Logan County. By G. W. Hudelson. *1974. Soil Conservation Service in cooperation with Illinois Agricultural Experiment Station. 99 pp., illus.; maps.*

Iowa

Guthrie County. By Robert C. Russell, Raymond I. Dideriksen, and Charles S. Fisher. *1974. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station. 117 pp., illus.; maps.*

Louisiana

Ouachita Parish. By Dayton Matthews, Emmett F. Reynolds, Garland P. Colvin, Tracey A. Weems, Clay A. Ray, James E. Seaholm, and W. Wayne Kilpatrick. *1974. Soil Conservation Service in cooperation with Louisiana Agricultural Experiment Station. 80 pp., illus.; maps.*

Michigan

Charlevoix County. By S. D. Alfred and A. G. Hyde. *1974. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station. 122 pp., illus.; maps.*

St. Clair County. By Gilbert R. Landtiser. *1974. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station. 113 pp., illus.; maps.*

Minnesota

Norman County. By Malvern N. Jacobson. *1974. Soil Conservation Service in cooperation with Minnesota Agricultural Experiment Station. 112 pp., illus.; maps.*

Nebraska

Howard County. By Charles F. Mahnke, Charles L. Hammond, and Laurence E. Brown. *1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 89 pp., illus.; maps.*

North Carolina

Transylvania County. By John M. King, John W. Turpin, and Daniel D. Bacon. *1974. Soil Conservation Service and Forest Service in cooperation with North Carolina Agricultural Experiment Station. 71 pp., illus.; maps.*

Texas

Terrell County. By August J. Turner and Robert E. Fox. *1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 35 pp., illus.; maps.*

Wharton County. By Harry F. McEwen and Jack Crout. *1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station 43 pp., illus.; maps.*

Virginia

Stafford and King George Counties. By Dan Isgrig and Adolph Strobel, Jr. *1974. Soil Conservation Service in cooperation with Virginia Polytechnic Institute and State University. 124 pp., illus.; maps.*

Washington

Cowlitz Area. By Willard A. Call. *1974. Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. 112 pp., illus; maps.*

Meetings

August

11–14 *Conservation Education Association, Syracuse, N.Y.*
11–14 *National Farm and Power Equipment Dealers Association, Minneapolis, Minn.*
11–14 *Soil Conservation Society of America, Syracuse, N.Y.*
12–14 *Conference on Great Lakes Research, Ontario, Canada*
12–20 *Tenth International Congress of Soil Science, Moscow, U.S.S.R.*
14–16 *American Society of Civil Engineers, Irrigation and Drainage Conference, Biloxi, Miss.*
18–21 *American Institute of Chemical Engineers, Salt Lake City, Utah*
18–21 *American Agricultural Economics Association, College Station, Texas*

September

4–6 *American Water Works Association Chesapeake Section, Ocean City, Md.*
8–11 *American Fisheries Society, Honolulu, Hawaii*
9–13 *Seventh Congress—International Association for Research Into Water Pollution, Paris, France*
10–14 *Third International Man, Air, Water, Noise and Waste Exhibition, "Environment Expo," Paris, France*
11–13 *International Association of Game, Fish and Conservation Commissioners, Honolulu, Hawaii*
22–26 *National Association of State Departments of Agriculture, Milwaukee, Wis.*
22–27 *SCS State Conservationists Annual Meeting, Lexington, Ky.*
22–27 *Association of Conservation Engineers, Rapid City, S. Dak.*
29–Oct. 2 *American Forestry Association, Mackinac Island, Mich.*

October

5–8 *National Environmental Sanitation & Maintenance Educational Conference, Chicago, Ill.*
6–11 *Water Pollution Control Federation, Denver, Colo.*
9–13 *American Horticultural Society, Arlington, Va.*
10–11 *American Forest Institute, Minneapolis, Minn.*
11–14 *National Association of Biology Teachers, Inc., New York, N.Y.*
12–15 *Farm and Industrial Equipment Institute, Orlando, Fla.*
14–17 *American Society for Testing and Materials, Detroit, Mich.*
15–18 *Future Farmers of America, Kansas City, Mo.*
15–18 *National Conference of Editorial Writers, Louisville, Ky.*
15–18 *National Recreation Research Applications Workshop, Copper Mountain, Colo.*
20–24 *National Association of County Agricultural Agents, Tucson, Ariz.*
20–25 *National Congress for Recreation and Parks, Denver, Colo.*
21–25 *Association of Engineering Geologists, Denver, Colo.*
21–25 *American Society of Civil Engineers, Kansas City, Mo.*
23–26 *National Council for Geographic Education, Chicago, Ill.*
27–30 *Sprinkler Irrigation Association, Lake Buena Vista, Fla.*
28–30 *American Plywood Association, Houston, Tex.*
31–Nov. 1 *American Association For Vocational Instructional Materials, Atlanta, Ga.*

☆U.S. GOVERNMENT PRINTING OFFICE: 1974 582-237/1 1-3

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101

POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.



Silt deposit from heavy rains in Monona County, Iowa. (See "Wet, wild spring in Iowa," page 7.)

SOIL conservation

U.S. DEPT. OF AGRIC. NAT'L AGRIC. LIBRARY

U. S. Department of Agriculture
Soil Conservation Service
September 1974



From the Administrator

'Creative Conservation' in Fort Union

Perhaps for the first time in the history of this country, we have the opportunity, on a large scale, to plan how land will be used *before* it has been surface mined.

This opportunity concerns the Fort Union geological formation—one of the world's largest coal reserves. Its thick coal seams range from 50 to 300 feet and run through four states—Montana, Wyoming, North Dakota, and South Dakota.

The projected removal of these reserves makes Fort Union one of the most critical areas in the nation today in terms of land use planning.

Without question, the first step in making reclamation plans is to complete soil surveys of the area.

Congress, industry representatives, state and local agencies, conservation districts, and others are urging us to accelerate soil survey work in the Fort Union area.

We have altogether about 34 million acres yet to be mapped in the Fort Union area—16 million in Montana, 8 million in North Dakota, 6 million in Wyoming, and 4 million in South Dakota.

Once an area has a soil survey, we can—before mining begins—work through conservation districts to help the rancher or farmer or company plan a suitable land use for the time when the seam has been removed. Topsoil can be stockpiled, the mining operation managed, and the land shaped, all with the goal in sight of good land for range, recreation, crops, or wildlife.

The thick seams in the Fort Union area also mean that only a small acreage need be exposed at any one time. A fairly large operation I visited this summer in Wyoming indicated it never expected to have more than 80 acres in actual mining at any one time. Under such conditions, there's no reason a viable ranching operation couldn't be run at the same time that coal removal is going on. It's a challenge to us to help set the standards to enable such operations to be compatible.

We need to do this work before the fact, not after. And we need the basic inventory of the resource first.

The Service came into being at a time when dust was blowing off the plains, when corrections of past mistakes were needed.

Today, with four decades of experience behind us, we have the opportunity to plan ahead at Fort Union, to overtake a problem, and to carry out what can be termed "creative conservation" to help people there deal with both energy and environmental concerns.

Kenneth E. Grant

September 1974, Vol. 40, No. 2

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$5.65 per year, $7.10 foreign. Single copy, 50 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

SOIL conservation

Contents

2 From the Administrator

4 Center Focuses on Conservation Plants
Diane Rude Foose

6 Conservation Measures Aid Yankton Sioux
John M. Cross

8 'Durar' Hard Fescue: 'Grass of All Trades'
John L. Schwendiman

10 Native Plants Studied in Lake Tahoe Area
Jack R. Carlson and John C. Buckwalter

11 Pines on a High Salt Diet
Cluster R. Belcher and Frederick B. Gaffney

12 The Meaning of Mosaics
Hubert W. Kelley

16 'Tryouts' Underway for Plants To Stabilize Surface-Mined Land in Kentucky
H. Wayne Everett and Donald S. Henry

17 Conservation District Raises 'Pluglings'
Max D. Bolar

18 Joint Venture Benefits Ranchers, Range
Harmon S. Hodgkinson

20 'Cape' American Beachgrass Anchors Dunes
Frederick B. Gaffney

21 Recon

22 Soil surveys

23 Reviews

23 Meetings

COVER: Gilbert Lovell, manager of the Soil Conservation Service's National Plant Materials Center in Beltsville, Maryland, takes notes on a clover which is being evaluated as a potential livestock forage and ground cover. See story on page 4.

Started in 1938

Center Focuses on Conservation Plants

by Diane Rude Foose
Information Division, SCS, Washington, D.C.

When things get too uncomfortable in the greenhouse at night, an alarm goes off in Gilbert Lovell's bedroom.

Lovell, manager of the Soil Conservation Service's National Plant Materials Center in Beltsville, Maryland, is thus the first to be warned when temperature or humidity changes are great enough to endanger the rare and valuable seedlings for which he is responsible. He and his family live at the Center full time to provide the constant attention necessary.

The 140-acre National Center is part of SCS's effort to find new plants or adapt older ones that can help to solve soil and water conservation problems. It's one of 20 plant materials centers around the country, from Hawaii to New Jersey, that SCS either operates or cooperates with in some way.

Seeds gathered from around the world are nurtured at the Beltsville Center. Once a plant shows potential value for some conservation use, the seed or plants are produced and distributed by the National Center to be "environment-evaluated" at other plant materials centers where they seem most likely to adapt.

Work is also done, both at the National Center and at centers around the country, in seed culture for both native and foreign plant species.

The goals of SCS plant materials specialists include finding plants to stabilize waste disposal areas . . . extend grazing seasons . . . improve windbreaks and shelterbelts and reduce air pollution, snow drift damage, and wind erosion.

The specialists are also seeking "fire-retardant" plants to replace highly flammable brush, as well as to help with more "normal" needs: plants to stabilize and beautify such prime sediment sources as surface-mined lands, highway slopes, recreation sites, and urban and



Lovell and John Kimmons, soil conservationist, check markers used for plants evaluated for reducing roadside erosion.

industrial development areas.

The National Plant Materials Center gets its experimental seeds and cuttings, both foreign and domestic, from USDA's Agricultural Research Service (ARS) Plant Introduction Stations, from the ARS Germplasm Resources Laboratory at Beltsville, from State Agricultural Experiment Stations, from SCS field people and from seed and nursery companies.

Since 1938, the National Plant Materials Center has received and observed more than 23,000 plants.

Once a plant has been tested and found to give a superior performance, it is released to seed growers and nurserymen for commercial production.

SCS keeps limited amounts of each seed and plant that is released in order to make grants to conservation districts, schools, and laboratories.

The National Center also acts as a coordination point for requests for seeds from other plant materials centers.

When requested seeds are available, the National Center arranges to have them sent out. In cases where a requested seed may not have been introduced into the United States, arrangements are made with the Agricultural Research Service to collect the seed during the next ARS exploration trip to the native country of the sought-after plant.

Over the years, more than 110 plants have been released through the plant materials system of SCS and cooperating agencies.

Examples include 'Cardinal' autumn olive, 'Emerald' crownvetch, 'Latar' orchardgrass, and 'Lana' woollypod vetch.

'Cardinal' autumn olive yields a large quantity of red fruit—individual plants have been known to produce 90 pounds. This fruit ripens in the fall but remains on the plant until late winter, making the plant attractive to large numbers of birds. Planted in hedgerows, 'Cardinal' autumn olive screens noise, dust, and wind.

The National Plant Materials Center first began observing autumn olive—a native of the Far East—in 1940. The strain 'Cardinal' was released in 1963 by the Big Flats Plant Materials Center in Big Flats, New York, after it showed outstanding characteristics as a wildlife food in the East and Midwest.

'Emerald' crownvetch provides ground cover so dense that it is capable of camouflaging litter thrown along roadsides. Used for stabilizing and beautifying highway banks, revegetating strip-mine spoils, providing pasture, and landscaping commercial areas, industrial sites, and parks, 'Emerald' crownvetch is in great demand as a plant that protects the environment.

Discovered by a plant exploration team to southeastern Russia in 1911, it was released jointly by SCS and the Iowa Agricultural Experiment Station in 1961. Today, its white to reddish-purple blossoms can be seen along highways from the East Coast to eastern Nebraska and Kansas in the summer.

'Latar' orchardgrass, brought to this country from a 1934 expedition to Russia, is well known as a conservation plant in the northwestern and northern United States. A quality feed when combined with legumes in hay, pasture, and silage, 'Latar' orchardgrass was released in 1957 by the Pullman and Aberdeen Plant Materials Centers and Agricultural Experiment Stations in Washington and Idaho.

'Lana' woollypod vetch contributes $6 million annually to the economy of California from grazing alone. It's been seeded on 600,000 acres of California's rangeland which is dominated by annual vegetation. There, it helps control medusahead, one of the worst range weeds in both Oregon and California. It's also used to stabilize roadsides and as an emergency ground cover on brushburned areas where it can control erosion and flooding. Brought to the United States from southwestern Turkey in 1936, the plant was released by SCS and the University of California Agricultural Experiment Station in 1960. ♦

SUMMER JOB IN THE GREENHOUSE

This summer, the National Plant Materials Center had its first female plant sciences technician on the staff.

Marion Filby brought to the job a background in plant taxonomy, plant physiology, and greenhouse plant propagation—plus a desire to make botany a career.

At the National Plant Materials Center, Miss Filby maintained young plants in the greenhouse, harvested seed, helped with plant propagation, and took care of a cold frame.

Other experiences valuable to the future botanist included helping set up an irrigation system, hoeing and weeding, filing seeds in the Center's walk-in refrigerator, and weighing and sending out seeds requested of the National Center.

Conservation Measures Aid Yankton Sioux

by John M. Cross
Information specialist, SCS, Lincoln, Nebraska

Though it may be a lot smaller than many other reservations in the state of South Dakota, the Yankton Sioux Indian Reservation at Greenwood had a mighty big conservation problem.

Silt flowing out of the steep Missouri River bluffs above the little village of Greenwood has damaged a 104-year-old church, endangered homes, and encouraged the tribe's young people to move away in search of jobs as their village declined.

The Yankton Sioux moved to the little village of Greenwood in 1856, 2 years before their chiefs signed the Yankton Treaty with the United States.

Holy Fellowship Episcopal Church, built there in 1870, was the first Episcopal Cathedral in South Dakota and one of the state's first churches. In recent years, silt built up around the church's foundation until the building had to be raised to prevent it from rotting.



Percy Archambeau, tribal chairman of the Yankton Sioux Tribe, and Lyle Laberee, coordinator for the Randall RC&D Project, examine the inlet of the principal spillway of the grade control structure built to protect the village of Greenwood, South Dakota.

Something had to be done.

In the spring of 1966 Tribal Chairman Percy Archambeau, Soil Conservationist Roy Lemke of the Bureau of Indian Affairs, and church officials asked the Randall Resource Conservation and Development Project (RC&D) for help.

In 1970, the Department of Housing and Urban Development proposed to build 30 housing units for Indian families at Greenwood. Tribal Chairman Percy Archambeau knew that the building process, coupled with existing soil erosion problems, would bring havoc to Greenwood.

"We were concerned with their problems," said Marvin Larson, chairman of the Randall Resource Conservation and Development (RC&D) Project Council. "We knew we would not only be helping the tribe but we would help the entire area by reducing the silt going into the Missouri River."

The RC&D Council and the Yankton Sioux teamed up with the Charles Mix Conservation District governing body and county commissioners to stop the silt and end the washing away of a road fill in the village. What was once that troublesome road fill has been rebuilt into a grade stabilization structure with a road across the top of the dam.

Tribal Chairman Archambeau had been trying to find a way to get the water through Greenwood when RC&D Project Coordinator Lyle Laberee and other SCS staff came up with the idea of diverting it around the village.

A 1,470-foot diversion was built along the bottom of the steep slope above the village. Water from the diversion flows into a vertical 72-inch riser and out through a horizontal 60-inch barrel to the Missouri River without damage.



The Yankton Sioux Tribe moved to Greenwood in 1856—2 years before the signing of the Treaty with the United States.

Young Indian families are now moving back to Greenwood. The tribe owns controlling interest in a pork processing plant in nearby Wagner and some villagers are employed at the processing plant. Children ride their bicycles along Greenwood's streets between the new homes without worrying about mud.

A scenic parkway being built through the area by the state of South Dakota is completed as far as Greenwood. Travelers are able to stop at a monument built on a hill above the village to honor the Indian chiefs who signed the 1858 treaty. Tribal Headquarters and Holy Fellowship Church welcome visitors—and visitors appreciate no longer having to wade through mud. Land above the headquarters and church has been treated and covered with native grasses to slow runoff.

Soil Conservation Service employees assisting the Randall RC&D Project estimate $3,205 in annual benefits resulting from the erosion and sediment control measure—$1.70 for every dollar spent. Greenwood residents believe there are also many nonmonetary values in preserving a village, new dwellings, or a 104-year-old church. ♦



As a ground cover in this black locust woodlot, 'Durar' hard fescue shows its shade tolerance and its effectiveness as a ground cover and weed suppressant. 'Durar' hard fescue is used on roadsides, ditchbanks, and as an orchard cover crop.

'Durar' Hard Fescue: 'Grass of All Trades'

by John L. Schwendiman
Plant materials specialist, SCS, Pullman, Washington

Ten years ago, the American Society of Agronomy registered an improved variety of grass called 'Durar' hard fescue.

Today, some call it "the grass of all trades."

Over the years, it has lived up to its name and more. Not only is it durable, as its name implies, but it is versatile, with new uses being found every year.

One of the newest: it is being used as cover for ski slopes to hold the soil in place, and retard competing shrubs and trees. An unexpected measure of its durability is that youngsters are sliding down the grass in summer as well as on snow in winter.

'Durar' hard fescue has proved to be a grass of many uses: as rough turf, ground cover, and as a soil builder. It is used along roadsides, on mine spoils, around farm ponds, terraces, diversions, and ditchbanks, and around farm airports.

'Durar' hard fescue, of European origin, came from an old introduction test planting at the Eastern Oregon Livestock Experiment Station at Union, Oregon, where the Pullman, Washington, Plant Materials Center of the Soil Conservation Service had plots seeded for observation.

Hard fescue is the European

counterpart of Idaho fescue, green fescue, and Arizona fescue, all of which are native to western United States. It is also closely related to commercial chewings fescue and sheep fescue.

In extensive comparison tests with many strains of these grasses, 'Durar' hard fescue showed favorably as to longevity, durability, palatability, and adaptability. It was far ahead in ease of establishment and seed production. More than 1,000 pounds of clean seed per acre have been produced at the Pullman Center.

One of the first field plantings of what came to be known as 'Durar' hard fescue was on a roadside seeding in Washington's Douglas Soil Conservation District in cooperation with the county highway department. Made in a dry year, the planting developed slowly. In 2 years, there was complete cover. In 8 years, the original planting had expanded to 10 times its original size through volunteer plants established from seed scattered by traffic up and down the road.

Current seeding recommendations are 5 to 10 pounds of seed per acre, mixed with an equal amount of 'Nordan' crested wheatgrass. The wheatgrass establishes readily and, in fewer than 5 years, 'Durar' hard fescue takes over completely.

This mixture has been adapted and widely used by the highway departments of Washington and adjacent states on silt loam soils in 12- to 20-inch rainfall zones. 'Durar' hard fescue is unexcelled for conservation seedings with its heavy, fibrous root system.

In alternate rows with 'Ladak' alfalfa, it produces over 11,000 pounds per acre of air dry roots in the surface 8 inches of soil. This is in addition to 8,000 pounds produced by alfalfa in the mixture and almost twice as much as alfalfa produces when planted alone.

In range seedings, orchard cover crops, woodlot plantings, and on fairgrounds, 'Durar' hard fescue holds soil in place.

It was the principal grass used on the Farragut, Idaho, recreation area where worldwide and national Boy Scout Jamborees have been held.

'Durar' hard fescue is competitive and it suppresses weeds. Seeded in a goatweed area on the snow, after a fire, or after chemical treatment, 'Durar' hard fescue has prevented the weed from setting seed and nearly eliminated it. The same thing has happened with patches of Canada thistle and other noxious weeds.

On roadside and in farmyard seeding 'Durar' hard fescue requires little care. Although it makes a heavy seed crop the year after planting, in subsequent years few stems are produced, and the long basal leaves provide complete ground cover. Leaves stay green late into the season and provide some protection from fire.

'Durar' hard fescue, a nearly universal grass in north temperate climate, requires good drainage. It has been used from sea level to 10,000 feet and from Arizona and New Mexico to Alaska, where it is one of the grasses considered for revegetation. This hardy grass has found its way east where it has demonstrated potential possibilities for use on coal mine spoils.

'Durar' hard fescue is effective for revegetation of other disturbed areas, for wildlife cover plantings, for conservation seeding, and no doubt for a myriad of yet undiscovered uses. ♦

Short Course on Erosion Control Offered in Olympia

A short course on erosion control brought a capacity audience earlier this year in Olympia, Washington.

Experts from state, federal, and private agencies spoke on the course theme of "Soil Erosion, Prevention, and Sediment Control."

Among those from the Soil Conservation Service on the program were Stan Swanson, manager of the Plant Materials Center at Corvallis, Oregon, and Stan Hobson, state conservation engineer at Spokane, Washington. Swanson discussed the use of legumes and other plants for cover, and Hobson talked about stream alignment control.

Topics ranged from vegetative cover on critical areas to use of ornamental plants to highlight esthetic values.

Among those attending were timber managers, highway and county road engineers, landscape architects, foresters, soil conservationists, wildlife biologists, and land developers.

The short course was sponsored by the Cooperative Extension Service, Washington State University. Cochairmen were Joseph Buhaly, Extension forester, and Stanton E. Brauen, Extension agronomist, both from the Western Washington Research and Extension Center, Puyallup, Washington.

Among those assisting in the planning were the Soil Conservation Service, the Washington Departments of Ecology, Natural Resources, and Highways, and Washington Irrigation and Development, Inc.—by W. H. Billings, *plant materials specialist, SCS, Corvallis, Oregon.* ♦

Native Plants Studied in Lake Tahoe Area

by Jack R. Carlson and John C. Buckwalter
Soil conservationist, SCS, Lockeford, California, and Chairman, Tahoe-Verdi Soil Conservation District, Incline Village, Nevada

What's ahead for Lake Tahoe?

Some residents are interested in developing the area into the nation's most popular resort . . . others want to return it to nature . . . still others want it as a nice place to live.

But there's another group of residents interested in only one thing: survival.

These residents are plants . . . and their survival depends on keeping soil on the mountains and out of Lake Tahoe.

That's the project tackled by the Tahoe-Verdi Soil Conservation District, with the assistance of the Soil Conservation Service's Plant Materials Center at Lockeford, California.

They're working to develop and put native plants in areas where there is a great need to stabilize the soil: areas denuded by highway construction, shopping centers, condominiums, casinos, and ski slopes. Ugly manmade cuts and abrasions need to be healed with green cover.

A number of native plants can do the job . . . but they need help in propagation and in getting established.

For instance, many of the native species have seeds that germinate sporadically over many years, making survival in the harsh environment of the Sierra Nevada possible. However, germination must be uniform and timely in the nursery.



Native shrubs, bitterbrush and greenleaf manzanita, invade a cut slope.

Work at the SCS center and elsewhere has meant that most of the native species can now be propagated by special treatment to induce germination.

Among the plants being looked at for the Lake Tahoe area are squaw carpet, pinemat manzanita, and mountain pride —all attractive and effective ground covers. Larger shrubs include greenleaf manzanita, big sagebrush, whitethorn, snowbush, bitterbrush, and bush chinquapin. Attractive mixtures of these well-adapted plants give the landscape variety.

Establishing these native species on sites much harsher than where they grow naturally is a tough job. Studies are being conducted in such areas as nursery container sizes, spring versus fall planting, mulches, controlled release fertilizers, and irrigation. Needs are being determined for what it takes to establish plants on different slopes and exposures.

Results are encouraging. Mountain pride, squaw carpet, big sagebrush, and bitterbrush have been established with minimum treatment.

The natural invasion of native

shrubs and trees alone is not enough to stop disturbed soil from eroding into the streams and into Lake Tahoe. The decomposed granitic soils around Lake Tahoe are very unstable, once denuded, and quick stabilization by other means is needed.

Good, fast covers are produced by 'Sherman' big bluegrass, 'Luna' or 'Topar' pubescent wheatgrass, 'Latar' or 'Potomac' orchardgrass, and 'Fairway' crested wheatgrass seeded in various combinations, with suitable mulching. Slopes can't be graded any steeper than 2 feet of horizontal distance to 1 foot vertical drop.

Once the slope is stable, it is then ready for the invasion or the introduction of native shrubs to give permanent and natural protection and to restore the region's esthetic quality. ♦

PINES ON A HIGH SALT DIET

by Cluster R. Belcher and Frederick B. Gaffney
Soil conservationist and manager, Cape May Plant Materials Center, SCS, Cape May Court House, New Jersey

It's enough to send chills down the back of any gardener, but Soil Conservation Service plant specialists in New Jersey are applying generous amounts of rock salt around pine seedlings.

Mission: to find pines resistant to salt water and salt spray along the seacoast.

Testing four pine species—white pine, Austrian pine, pitch pine, and Japanese black pine, the plant specialists have found Japanese black pine to be the most salt-tolerant and white pine to be the least.

The tests began at the plant materials center in Cape May with an application rate of 4,000 pounds of rock salt per acre back in March 1971. This stunted the growth of all the seedlings.

The next spring, salt was again applied at the same rate. And again, Japanese black pine showed little damage. Its terminal growth was reduced by 3 inches, while terminal growth on the other three species was reduced by 4 to 8 inches.

In yet another test, rock salt was applied at the rate of 16,000 pounds per acre to seedlings in other plots.

Only a single seedling survived. This "super seedling," again a Japanese black pine, has since been transplanted to a better site and will be used as a seed source.

Plant specialists at Cape May Court House are continuing their work to select a Japanese black pine that will be highly tolerant of salt either in the soil or in the air. Both the Soil Conservation Service and the Forest Service are cooperating in this project.

The Japanese black pine was introduced into the United States near the end of the last century from the coast of Japan. Noted for its deep green needles throughout the winter, it is winter hardy as far north as Long Island, New York ♦



At Cape May, Donald Hamer, Sr., SCS biological technician, checks the Japanese black pine that survived a rock salt application equivalent to 16,000 pounds per acre. This "super seedling" is maintained for a future seed source.

The Meanin

Last spring, the first cloud-free "photomaps" of the 48 contiguous states and Alaska were assembled from satellite images. The work was done by the Soil Conservation Service for the National Aeronautics and Space Administration (NASA). Technically called "mosaics," each of the 16-foot-long "maps" is composed of 595 black-and-white images obtained from an altitude of 560 miles by NASA's first Earth Resources Technology Satellite (ERTS-1). One set of images uses the red portion of the visible spectrum (Band 5), and shows land use patterns clearly. The second mosaic uses images in the near infrared part of the spectrum (Band 7), and shows water, including stream and river systems. To get some notion of the importance of the new "photomaps" to scientists and laymen, SCS Information Director Hubert Kelley interviewed Dr. Roy A. Welch, associate professor of geography, University of Georgia, as they examined the Band 5 map in the lobby of the Geological Survey National Center in Reston, Virginia.

Map buff Roy A. Welch, who teaches geography at the University of Georgia, explains why the 10- by 16-foot SCS mosaic of the United States gives scientists a new perspective on this country.



of Mosaics

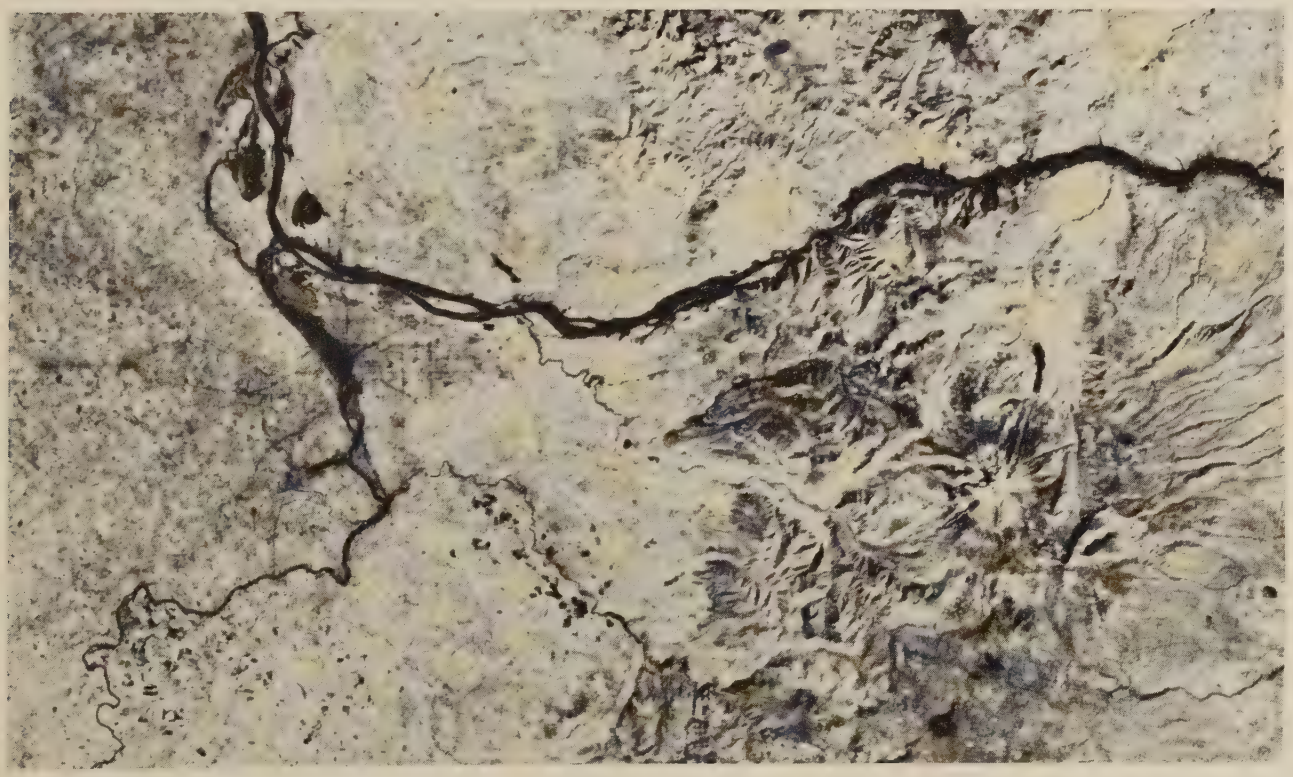
Q. Dr. Welch, I notice that you wince every time I call this thing a map. What do you call it?
A. I call it by its correct name—a mosaic—which is an assembly of continuous tone photographs. On a map, features like roads or vegetation or elevation or towns have been put in there by a cartographer and interpreted for the user. But in a mosaic like this one, you see everything. The detailed interpretation of what you see is left to the user.

Q. But isn't there so much to see that it's hard for an amateur to make anything of it?
A. To some extent, perhaps. But you'd be surprised at the ability of nonprofessionals to relate to what they see on a mosaic, particularly if they can examine it side-by-side with a map of about the same scale. When you start working back and forth from a map to this mosaic, you begin to see lots of interesting things.

Q. What is it that makes the mosaic so exciting to people interested in maps?
A. What SCS has provided us here is the first photoview of the entire United States—if Hawaii will forgive me, because it doesn't include Hawaii—at a base scale of 1:1,000,000. That means that 1 inch on the mosaic is equal to a million inches (1 inch = 16 miles) on the ground. We've never had a view of the United States just like this before.

Q. What are some of the things you see when you step back and look at the mosaic?
A. First, I can see the regions of the country—and their relation to one another—in considerable detail. I can see the regions in terms of natural land forms, not because the geographer has colored the Great Plains yellow and the Rockies purple, but because these regions are really and truly there. That's going to make

In Oregon, Portland and its major roads can be discovered southeast of the confluence of the north-south Willamette and the Columbia rivers. Snowcapped Mount Hood is at the extreme right.



quite an impression on young students, who don't always believe everything you tell them these days.

Q. You mean it will make geography more credible?
A. Absolutely. It will spice it up. And geology, too.

Q. What else can you see?
A. You can see American history. You can see the beginnings of the public land survey, as you move from the irregular field patterns of the first states in the East to the neat rectangular sections in the Midwest and Plains. In southern California, you can see the very intensive agricultural development in the Imperial Valley. The mosaic shows a little bit of Mexico, and you can see that development becomes a lot less intensive and regimented when you cross the border.

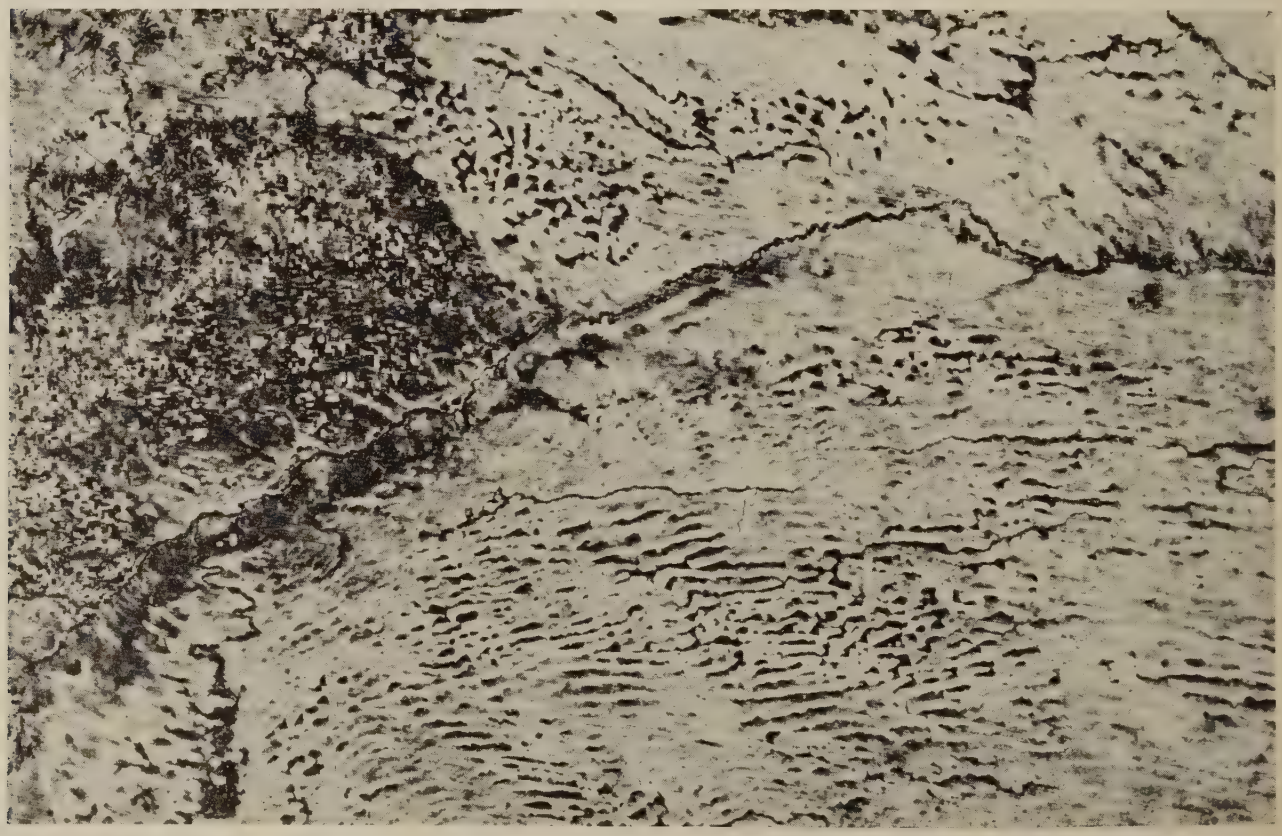
Q. Yes, I can see that. Anything else?
A. Oh, so many things. In the sand hill country of Nebraska, you can actually see the dune pattern, and I don't recall ever seeing that before on a map or mosaic. And in Florida, in the Everglades, you can see a swirl pattern showing not only where water is now, but where it has been. These things are just shown as symbols on conventional maps.

Q. What do you foresee as some of the practical uses of the mosaics?
A. They should be useful to planners. For instance, we might have regional land use planners in three or four states getting together and asking, what's our land use situation in this area. Cultural patterns, like cropland vs. grazing land, stand out very clearly. I can foresee planners looking at this thing and saying: "Here's an area of intensive agriculture, and here it is primarily grazing, and this area is urbanized, and we expect more urbanization to extend from here to here during the next 20 years."

They now have a framework for a broad overall view of regions that they have never had before.

Q. How about geologists?
A. They probably were the first scientists to really appreciate your mosaics. Geologists now

Dune patterns in Nebraska's Sand Hills show clearly in the Band 5 mosaic. Note the abrupt change from cattle grazing country to cropland on the left.





South of the Salton Sea in southern California is the pattern of some of the most intensive irrigated farming in the world—the Imperial Valley. The International Border is clearly discernible in the Band 7 mosaic where the intensity of agriculture changes.

can move continuously from one area to another, instead of studying one area, and then packing up and moving to another. They are tracing faults—geologic, of course—on the mosaic and finding that they go much farther than was suspected—some over a thousand miles. And they have found new faults. In time, they should also learn something about the location of new mineral and water deposits. And flood plains. Scientists, including geologists, consider the SCS mosaics to be one of the first really good applied products to come out of the ERTS program.

Q. Will the mosaics show up errors in existing maps?

A. Yes, minor errors. A real potential lies in revising existing small scale maps, plus the development of new land form maps. The mosaics also could have an impact on aeronautical charts. And they will be used to check and revise the *National Atlas* series, since the SCS mosaics were produced at the same map projection as those in the *Atlas*. That is no small part of their value, by the way.

Q. Dr. Welch, if I were a visitor from another planet, and could get no closer to earth than 560 miles, could I tell for sure that our planet was inhabited? Could I be certain that the United States was occupied by intelligent beings?

A. Oh, sure. Besides making out the field patterns, you can see the outlines of the big cities and other results of man's labor, like highways and Garrison Dam on the Missouri River. You can even make out the freeway pattern in Los Angeles—assuming you consider Los Angeles to be the work of intelligent beings. And a lot of people seem to think it is. ♦

'Tryouts' Underway for Plants to Stabilize Surface-Mined Land in Kentucky

by H. Wayne Everett and Donald S. Henry
Plant materials specialist, SCS, Lexington, Kentucky, and manager, Quicksand Plant Materials Center, SCS, Quicksand, Kentucky

Surface mining is a growing business in Kentucky. The number of stripping permits requested in the first 3 months of 1974 is double that requested during the same period in 1973.

More mining means more land to reclaim. Since 1967, the Quicksand, Kentucky, Plant Materials Center, run by the Soil Conservation Service in cooperation with the University of Kentucky Agricultural Experiment Station, has been developing plant materials to stabilize surface-mined land effectively and economically. What the Center has learned will help in reclaiming the newly mined areas.

Situated in the surface-mined coalfields of eastern Kentucky, the Center began field evaluation plantings on recently graded acid spoil (pH 4.2 to 5.4) in Breathitt and Perry Counties the same year the Center was established—1967. Plantings were made on both leveled and steeply sloping areas.

Tree species showing the best survival and growth rates to date are speckled alder, black locust, sycamore, eastern cottonwood, European black alder, and loblolly pine. Eastern cottonwood is growing more vigorously on sloping than on leveled spoil, probably because the soil on the slopes is more porous.

Shrub species rated best for survival and growth to date are 'Arnot' bristly locust, 'Cardinal' autumn olive, silky dogwood, red-osier dogwood, and fragrant sumac.

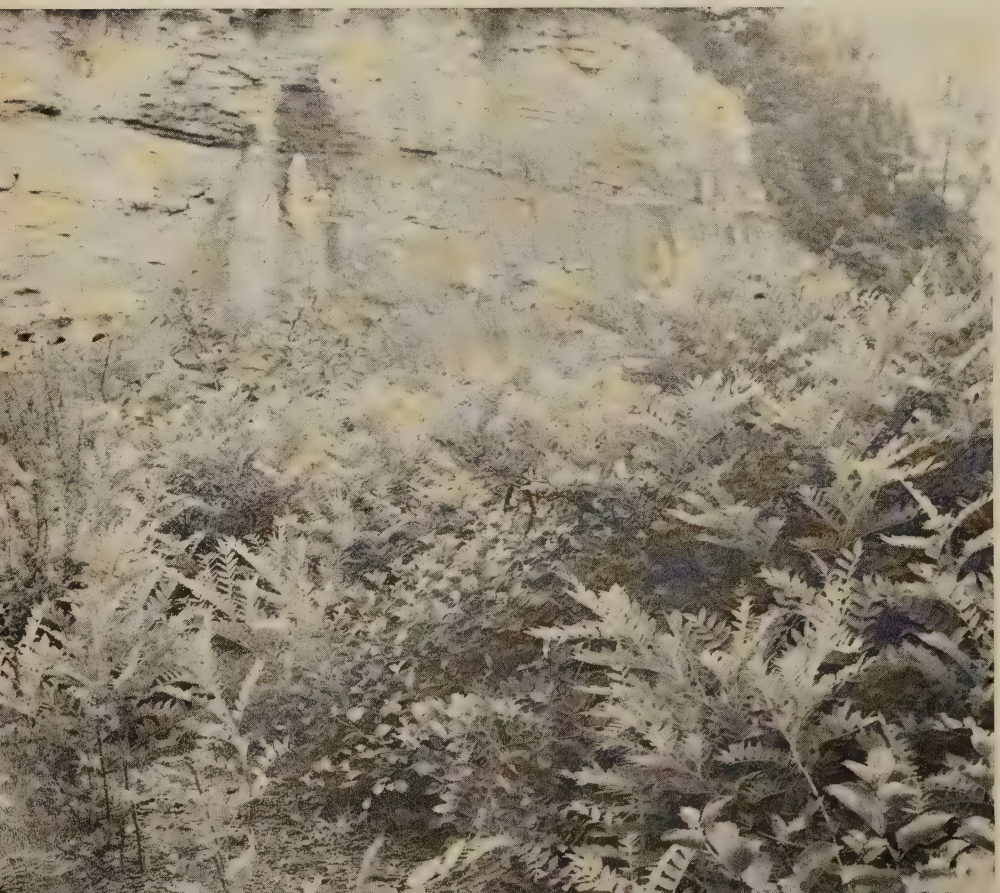
Broadcast seedings of 'Chemung' crownvetch and 'Lathco' flatpea completely covered steep slopes after 3 to 4 years. Dwarf Japanese fleeceflower, an herbaceous perennial, also did well on extremely acid sites.

Soil Conservation Service plant materials centers have recently released two new plants, 'Arnot' bristly locust and 'Lathco' flatpea for use in stabilizing surface-mined land. 'Arnot' bristly locust has been used widely by conservation districts, state reclamation agencies, and mine operators on critically eroding areas. 'Lathco' flatpea is now available in limited quantities from commercial producers in the Northeast.

The demand for such plants is likely to remain strong. The Kentucky Legislature recently voted to require stabilization of deep mine refuse piled on surface land.

Also, the State Legislature has authorized the sale of $50 million in state bonds to finance part of a pilot project to build coal gasification and liquification plants near the Kentucky coal fields. ♦

This stand of 'Arnot' bristly locust, planted as a single row of seedlings seven growing seasons ago, is now 78 feet wide on a strip-mined coal field in eastern Kentucky. It is one of SCS's field evaluation plantings on surface-mined land.





District nurseryman Morris Byrd shows a styrofoam block containing pluglings to Monroe Samuel, NACD Forestry Committee chairman, and M. J. Spears, SCS state conservationist for Arkansas.

Conservation District Raises 'Pluglings'

by Max D. Bolar
Forester, SCS, Little Rock, Arkansas

The Little River Conservation District in Arkansas is raising tree "pluglings" for plantings around the state.

The district expects production to reach 100,000 pluglings a year within the next few years. Currently, some 25 species are grown at the district's greenhouse.

Generally, these species are for beautification—for spring flower and fall color: They include dogwood, redbud, blackgum, sweetgum, lavender (vitex) tree, sumac, golden rain tree, and cherry laurel.

The plugling is a tree seedling grown in a carrot-shaped hole in a styrofoam block.

Planted in a mixture of peat moss and vermiculite, the seedlings are ready to plant in less than 6 months. Two crops can thus be raised annually in each container.

The district's project stemmed from the demand for planting stock by district cooperators in northern Arkansas. With the district greenhouse, cooperators can be assured of a definite supply and selected species.

In addition to meeting demands by its cooperators, the district plans to sell its pluglings at cost to other districts. Districts may then elect to give pluglings to landowners or to seek sponsors, such as civic organizations, to plant species for beautification or for wildlife on public lands.

Two Arkansas state highway districts in the northeast sector of the state have already planted pluglings for beautification purposes along major interstate highways.

The Little River Conservation District set up its nursery to raise the pluglings with the help of two retired Soil Conservation Service employees. Morris Byrd, former plant materials specialist, is now the greenhouse nurseryman and Charley McCollum, retired soil scientist, took charge of constructing the greenhouse. ♦



As the Block 40 Grazing Association was getting started, soil conservationists demonstrated to rancher Robert Lytle (center) how to check the degree of use on the rangeland.

Block 40 Grazing Association

Joint Venture Benefits Ranchers, Range

by Harmon S. Hodgkinson
Range conservationist, SCS, Ephrata, Washington

They've turned a "loser" ranch into a winner.

That's the story of six neighboring ranchers in Block 40 of the Washington State Columbia Basin Reclamation Project.

Together, the six stockmen formed the Block 40 Grazing Association and, financed by the Farmers Home Administration (FmHA), bought a 16,000-acre ranch about 60 miles north of Moses Lake and 10 miles west of Grand Coulee.

The joint venture has enabled the ranchers to expand their home ranches and get maximum use of winter feed grown on their irrigated hayland units. With better grass, the ranchers are finding their calves are 50 to 75 pounds heavier when they come in off the range.

The Block 40 Grazing Association was formed 7 years ago by the six men, all cooperators of the Moses Lake Conservation District: Harry Post, Olaf Odegaard, Robert Lytle, George Zucker, Perry Miller, and Rolf Dilling. All six had previously developed conservation plans on their individual irrigated units with the district.

Upon purchasing the 16,000-acre ranch, they became cooperators with the Foster Creek Conservation District and requested assistance in developing a conservation plan for that ranch.

The district called on conser-

vationists from the Soil Conservation Service, along with representatives from the Washington State Department of Natural Resources, to help the newly formed grazing association develop its range resource management plan.

The plan outlined priorities for introducing conservation practices, setting up an orderly development of the ranch that would meet the ranchers' long-range goals and coordinate resource management with the hayland operations. The Farmers Home Administration furnished economic evaluations and support.

Early work included range seedlings, water developments, brush management, and developing of a planned grazing system.

Range seedlings. One of the major requirements of FmHA-financed grazing associations is that all cropland be seeded to grass. Thus, about 1,200 acres of abandoned cropland and poor condition rangeland were seeded to grasses that balance the green feed period.

'Nordan' crested wheatgrass and Siberian wheatgrass were planted for spring use, since the key native grass, bluebunch wheatgrass, is the summer and fall forage in the association's grazing system.

One area which had some native bluebunch wheatgrass was seeded to an improved strain, 'Whitmar'.

Good land preparation, combined with proper timing of seeding and deferment from grazing, contributed to quick, successful stands.

Water developments. Eight springs were developed and two wells were drilled to provide adequate water and to distribute grazing more uniformly. Five miles of pipeline and 25 troughs were installed.



SCS's L. W. Tilden checks grass-legume seeding on the Block 40 grazing unit during its first year of operation.

One year, when the springs and ponds went dry, shallow wells were dug in the pond sites and a portable LP-gas engine pump automatically kept the stock tanks filled with clear, fresh water.

The association found successful grazing and efficient livestock distribution were feasible with good watering facilities.

Brush management. About 1,000 acres of dense sagebrush have been brought under a brush management program. Usable forage yields have tripled.

Careful consideration was given to sage grouse habitat in these projects. Strutting grounds for the grouse were identified and not sprayed.

As a result of complete planning, both wildlife and livestock needs were improved.

Planned grazing system. Each fall after the cattle are removed, association members and agency representatives check to see how the range is used. This helps in the development of the grazing schedule for the next season. The schedule guides the ranchers to the sequence of moving cattle so that each pasture is deferred in its turn during the green-growth period. Under this system, about 4,500 acres are deferred each year.

The use checks show that the association is grazing 15,000 acres properly each year.

The association members have been flexible in achieving such proper grazing practices. On one occasion, after following a planned grazing system through a drier year than expected, the ranchers took their cattle home a month and a half early to avoid overgrazing.

On another occasion, when a short grass year was anticipated, association members cut back their cattle numbers before putting them onto the summer range.

As a result of following scheduled grazing and proper use plans and meeting yearly goals, the Block 40 Grazing Association has seen a number of improvements on its ranch.

Plant vigor has improved, forage production increased, and beef production has climbed. By the end of the grazing season, when the calves are sold, they weigh 450 to 475 pounds—compared with the 400 pounds weight the ranchers were selling them at prior to their joint venture.

The range resource on the 16,000-acre ranch has been improved through consistent conservation during the last 7 years. Other benefits achieved include erosion control, water conservation, improvement of soil fertility, and improved wildlife habitat. ♦

'Cape' American Beachgrass Anchors Dunes

by Frederick B. Gaffney
Manager, Cape May Plant Materials Center, SCS, Cape May Court House, New Jersey

A new beachgrass is "making waves" along the East Coast.

It's commonly called 'Cape'—for it was discovered and collected on Cape Cod, Massachusetts, in 1965 by W. Curtis Sharp, plant materials specialist for the Soil Conservation Service.

It's a variety of American beachgrass, which is an important sand-binding grass from Newfoundland to North Carolina. American beachgrass fits into the early plant succession of sand dunes and is frequently the first perennial grass to appear on dunes.

Culms of 'Cape' American beachgrass are correctly planted 7 inches into the sand.



What makes 'Cape' different from other American beachgrasses is that in comparison with 50 other beachgrass collections, it has proved superior in both stabilizing existing dunes and building new ones.

It produces many large-diameter culms—or stems—and long, broad, lax, deep-green leaves—all distinguishing marks from other strains of American beachgrass. The large culms contain a plentiful supply of food reserves and provide for a high survival rate for transplants.

'Cape' also has more culms and leaves than common American beachgrass. This increased vegetation reduces the wind velocity near the beach surface, resulting in heavier sand deposits; thus new sand dunes.

'Cape' American beachgrass was released in 1972 jointly by SCS's Plant Materials Center in Cape May Court House, New Jersey, and by Rutgers University, New Brunswick, New Jersey.

SCS recommends its use for stabilizing sand dunes and for building new ones. Three culms per hill are planted 6 to 8 inches into the sand. This depth of planting prevents the transplants from being blown out. Either 12- or 18-inch spacing between hills has given good results. Fertilizing soon after planting, with a high nitrogen fertilizer, has aided initial growth of the plants and provided "instant" protection to the dunes. ♦

Recon . . .

Fish farm facts. An SCS summary of fish farming activity in the United States reveals that there were 2,372 commercial catfish enterprises covering 259,128 acres as of April 15 of this year. There were 935 trout farms with 4,214 acres of trout; 853 minnow farms with 48,899 acres of commercial minnow production; and 564 other fish farms with 31,045 acres in 34 other kinds of fish. About 3,740 enterprises offer fee-fishing recreation. Although still a comparatively new type of agriculture, "aquaculture" now covers an acreage equal to half the acres devoted to farming in Delaware.

EPA-TVA to study heated water and fish. The Environmental Protection Agency and the Tennessee Valley Authority will study the effect of heated water on fish in two large-scale research projects in Tennessee and Minnesota. The Tennessee study will be to determine the effects of heated water discharges on the growth, reproduction, and survival of fish and other aquatic life in the waters of the southeastern United States. The Minnesota study will concentrate on the same problem, although with fish typical of northern waters. Scientists know that water temperatures vary with changes in weather and the amount of water flowing at any given time, and that, in fact, these changes are essential to aquatic life. However, when the entire temperature cycle is raised—such as from a power generating plant—aquatic life may suffer. Some heat added to the water can be beneficial, but biologists are concerned that the impact of increasing heat loads could be detrimental. The EPA-TVA study will attempt to pinpoint the problem levels for several species of fish.

Soil stops. A "Soils Tour" in Arizona recently gave SCS people an opportunity to tell planners and engineers about the types of soils in central Maricopa County and the uses that can be made of soil surveys.

Loaded onto a bus, the group —led by a team composed of a soil conservationist, soil scientist, engineer, and district conservationist—made a number of stops, digging holes with an auger and shovels, and comparing soils.

One preselected site on cropland revealed a caliche hardpan which provided an opportunity to discuss on the spot the limitations of the spot for septic tanks and buildings.

The first tour proved so successful that another was held for realtors.

Sod-seeding on stony sites. When sites are too stony, how about no-till production? Penn State reports several facets of no-till crop production under investigation there appear promising. At one site with several limestone outcrops that prevent use of conventional tillage techniques, researchers applied a contact herbicide and then seeded the area with alfalfa, birdsfoot trefoil, and crownvetch in July of 1971. The species were well established by winter. After some experimentation to control perennial broadleaf weeds, the researchers found that by 1972, the yields from the plantings were comparable to those obtained from conventionally seeded alfalfa, crownvetch, and birdsfoot trefoil at the research farm.

Organic ground. Why is humus so important to productive soil . . . how much is necessary . . . what are the possibilities offered by sewage sludge, chicken manure, and stable manure?

These are all questions a research scientist at the University of Georgia's College Experiment Station is looking into on a five-year project to study the rate of decomposition and adsorption of organic material in soil as well as all resultant chemical changes.

The scientist, Dr. Kim H. Tan, is expanding on previous work he did on the use of chicken manure as a raw organic addition to soil. In that study, he determined that 200 metric tons of chicken manure could be used per hectare (one hectare equals 2.471 acres) without fear of pollution.

Soil surveys

Alabama

Talladega County. By James A. Cotton, Lewis A. Dungan, Glenn L. Hickman, and Charles F. Montgomery. 1974. Soil Conservation Service and Forest Service in cooperation with Alabama Agricultural Experiment Station and the Alabama Department of Agriculture and Industries. 101 pp., illus.; maps.

Arizona

Long Valley Area. By L. D. Wheeler, Jr., and John A. Williams. *1974. Soil Conservation Service and Forest Service in cooperation with Arizona Agricultural Experiment Station. 78 pp., illus.; maps.*

California-Nevada

Surprise Valley-Home Camp Area. By H. B. Summerfield, Jr., and D. G. Bagley. *1974. Soil Conservation Service and Forest Service in cooperation with University of California and University of Nevada Agricultural Experiment Stations and USDI-Bureau of Land Management. 130 pp., illus.; maps.*

Indiana

Elkhart County. By Frank Kirschner and Paul McCarter. *1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 96 pp., illus.; maps.*

Kansas

Chase County. By James T. Neill. 1974. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 65 pp., illus.; maps.



Louisiana

Evangeline Parish. By B. Arville Touchet, Henry L. Clark, Carl M. Redlich, A. J. Roy, Billy J. Griffis, Steve J. Zaunbrecher, and Richard M. Hollier. *1974. Soil Conservation Service in cooperation with Louisiana Agricultural Experiment Station. 68 pp., illus.; maps.*

Maryland

Charles County. By Richard L. Hall and Earle D. Matthews. 1974. Soil Conservation Service in cooperation with Maryland Agricultural Experiment Station. 94 pp., illus.; maps.

Mississippi

Chickasaw County. By L. C. Murphree, J. S. Huddleston, and L. H. Nichols. *1974. Soil Conservation Service and Forest Service in cooperation with Mississippi Agricultural and Forestry Experiment Station. 68 pp., illus.; maps.*

Nebraska

Webster County. By Harry E. Paden and Larry G. Ragon. *1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 72 pp., illus.; maps.*

New York

Wyoming County. By John P. Wulforst, John A. Phillips, Willis E. Hanna, Paul Puglia, and Leslie Crandall. *1974. Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station. 199 pp., illus.; maps.*

North Carolina

Wayne County. By William L. Barnhill, Roy A. Goodwin, Jr., Marcus R. Bostian, Niles A. McLoda, Garth W. Leishman, and Richard J. Scana. *1974. Soil Conservation Service in cooperation with North Carolina Agricultural Experiment Station. 72 pp., illus.; maps.*

Ohio

Monroe County. By Ernest N. Hayhurst, Thomas N. Rubel, Glenn E. Kelley, and Paul Beining. *1974. Soil Conservation Service and Forest Service in cooperation with Ohio Department of Natural Resources, Division of Lands and Soil, and the Ohio Agricultural Research and Development Center. 123 pp., illus.; maps.*

Texas

Hemphill County. By Jack C. Williams, Anthony J. Welker, Frankie F. Wheeler, and Harry F. McEwen. *1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 55 pp., illus.; maps.*

Travis County. By Leroy E. Werchan, A. C. Lowther, and Robert N. Ramsey. *1974. Soil Conservation*

Service in cooperation with Texas Agricultural Experiment Station. 123 pp., illus.; maps.

Wisconsin

Rock County. By Robert J. Engel, Howard F. Gundlach, Keith O. Schmude, Carl L. Glocker, Edward L. Weber, and Frank L. Anderson. 1974. Soil Conservation Service in cooperation with University of Wisconsin Department of Soil Science, Wisconsin Geological and Natural History Survey, and Wisconsin Agricultural Experiment Station. 160 pp., illus.; maps.

Reviews

Snow Survey Safety Guide. *Revised, 1974. USDA Agr. Hbk. 137. 60 pp., illus., $0.85.* This pocket-size reference, designed primarily for snow surveyors, contains information about how to travel and work safely in snow and low temperatures. It also discusses rescue procedures and first aid to give when emergencies occur in remote areas where medical assistance is not available.

Our Land and Water Resources: Current and Prospective Supplies and Uses. *1974. USDA-Economic Research Service. Misc. Pub. 1290.* This report includes a current summary of national rural land and water uses, estimates of future land and water requirements to meet agricultural production needs, and an examination of problems stemming from competing uses and environmental conflicts.

Meetings

September

22–26	*National Association of State Departments of Agriculture, Milwaukee, Wis.*
22–27	*SCS State Conservationists Annual Meeting, Lexington, Ky.*
22–27	*Association of Conservation Engineers, Rapid City, S. Dak.*
29–Oct. 2	*American Forestry Association, Mackinac Island, Mich.*

October

5–8	*National Environmental Sanitation & Maintenance Educational Conference, Chicago, Ill.*
6–11	*Water Pollution Control Federation, Denver, Colo.*
9–13	*American Horticultural Society, Arlington, Va.*
10–11	*American Forest Institute, Minneapolis, Minn.*
11–14	*National Association of Biology Teachers, Inc., New York, N.Y.*
12–15	*Farm and Industrial Equipment Institute, Orlando, Fla.*
14–17	*American Society for Testing and Materials, Detroit, Mich.*
15–18	*Future Farmers of America, Kansas City, Mo.*
15–18	*National Conference of Editorial Writers, Louisville, Ky.*
15–18	*National Recreation Research Applications Workshop, Copper Mountain, Colo.*
20–24	*National Association of County Agricultural Agents, Tucson, Ariz.*
20–25	*National Congress for Recreation and Parks, Denver, Colo.*
21–25	*Association of Engineering Geologist, Denver, Colo.*
21–25	*American Society of Civil Engineers, Kansas City, Mo.*
23–26	*National Council for Geographic Education, Chicago, Ill.*
27–30	*Sprinkler Irrigation Association, Lake Buena Vista, Fla.*
28–30	*American Plywood Association, Houston, Tex.*
31–Nov. 1	*American Association for Vacational Instructional Materials, Atlanta, Ga.*

November

1	*Environment and Safety Briefing Session, Loew's L'Enfant Plaza Hotel, Washington, D.C.*
4–8	*Adult Education Association of the U.S.A., Miami Beach Fla.*
5	*American Seed Trade Association Conference, Kansas City, Mo.*
10–13	*American Bankers Association National Agricultural and Rural Affairs Conference, St. Louis, Mo.*
10–15	*Joint Meeting of American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America, Chicago, Ill.*
11–18	*National Grange, Sacramento, Calif.*
13–14	*Thirteenth Annual Purdue Air Quality Conference, Indianapolis, Ind.*
18–20	*Geological Society of America, Miami Beach, Fla.*
18–20	*American Association of State Highway Officials and Transportation Officials, Detroit, Mich.*
18–22	*Tenth American Water Resources Conference, Puerto Rico*
19–23	*Park Interpreters' Institute, Texas A&M University, College Station, Tex.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

5035
.5

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / October 1974

DEC 2 '74
CURRENT SERIAL RECORDS



From the Administrator

No Cocoons Around Professions

In the Soil Conservation Service, we speak proudly of our interdisciplinary approach to resource problems. But are we always as interdisciplinary as we claim to be?

Certainly the Service is a *multi*disciplinary agency, since we employ specialists in some 20 different disciplines. But our agency is *inter*disciplinary only to the extent that the various professionals work together and interact on a problem.

If engineers work only with other engineers, if biologists confer exclusively with other biologists, our product will be less than it should be. On the other hand, we can point to many examples of sound, workable Service plans that resulted from q high degree of interdisciplinary cooperation.

The Service has a written policy on the matter: "SCS uses an interdisciplinary planning process in which individuals or groups having different technical expertise jointly assess resource conservation opportunities."

It's a policy that demands a lot of a professional. Most of us would find work less demanding if we could spin a cocoon around our discipline and live there, secure from the thankless task of criticizing the plans of others and safe from the even more unpleasant chore of accepting criticism of our own ideas.

After all, it's hard enough to keep up with changes in our own professions.

The trouble with professional cocoons is that ours is not an engineering agency, nor a farm management agency, nor even a soils agency. Our product is *resource conservation,* an amalgam of the contributions of many disciplines and professions. Take away any one of them, and the resulting product isn't quite up to snuff.

This isn't just speculation. In looking over small watershed projects approved prior to the National Environmental Protection Act, we found that most projects that didn't have to undergo extensive review in light of the new legislation were precisely those projects where all relevant disciplines had been involved in the planning. They were the project plans that had enjoyed the benefit of the training and experience of engineers, agronomists, economists, and biologists from the outset.

When the various staff professionals fail to communicate with one another, they are undercutting the SCS employee on the line. After all, when a farmer or rancher comes to SCS with a problem, he doesn't talk to an agency, but usually with only one man, a lone Service employee. When that district conservationist speaks, he has to speak for all of us. And for him to do this, there has to be a team behind him, a team of specialists who have pooled their separate disciplines to create the one new discipline that is our real stock in trade—total resource conservation.

Kenneth E. Grant

SOIL conservation

October 1974, Vol. 40, No. 3

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$5.65 per year, $7.10 foreign. Single copy, 50 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

Contents

2 From the Administrator

4 A Virginia District and Youth Team Up
Vincent Price

7 'Lathco' Flatpea Keeps 'Open Spaces'
Robert D. Slayback and Sheridan I. Dronen

8 A City Saves Its Water Supply
Dennis Grundel

9 New Plantings for the Southwest
Dan Merkel and Dick Barber

10 Wild Turkeys Return to Illinois County
Russell Sass

11 'Trees . . . Play a Critical Role in Processes Within the Stream Itself'
Jane Hill

17 SCS Helps Establish Outdoor Nature Area at East Louisiana State Mental Hospital
Gene Warren

18 Watershed Project Sponsors Seed Newly Constructed Ditchbanks
James M. Winston

20 Boy Scouts Tackle Strip-Mined Area
David C. Graunke

22 Recon

23 Soil surveys

23 Meetings



Giving row boat tours of a marsh to visitors in Pohick National Park, Virginia, was one of the projects undertaken by the Fairfax County Youth Conservation Corps. Steve Gissendanner and Karen Rutledge give one tour here, while a second is in the background.

A Virginia District and Youth Team Up

by Vincent Price
SCS, Information Division, Washington, D.C.

Conservation districts across the country are turning to youth and involving students in conservation work of all types, to the benefit of the district, the students, and the general public.

One of the outstanding programs is in the Northern Virginia Soil and Water Conservation District. Its Youth Board in 1973 was so successful in involving the public and improving the community in Fairfax County, Virginia, that Virginia Governor Linwood Holton named the four Youth Board members "Virginia's Youth Conservationists of the Year" at the 1973 Governor's Conservation Awards Program.

The Youth Board, under the aegis of the Northern Virginia Soil and Water Conservation District, is a decisionmaking body that has a lot of independence and is encouraged to have free-wheeling brainstorming sessions.

"Young people are willing to change quicker than some of us older people, and this Youth Board has demonstrated that," explains Charles Hall, chairman of the conservation district. "They've really brought new ideas to the forefront."

One of these ideas was a county youth conservation corps.

Basically, Fairfax County Youth Conservation Corps (FCYCC) is a group of young people—high school sophomores to college freshmen—

interested in improving their county's environment and willing to work at it for a summer.

Last year the first FCYCC was coordinated through the Fairfax County Office of Environmental Affairs by Steve Gissendanner, a member of the Youth Board.

Corps members, paid through direct appropriation by the county board of supervisors, were "farmed out" for 8 weeks to several county and regional agencies. Of 20 FCYCC members, half worked for the regional park authority, and the others worked with the public school system, public works, the public health department lab, the county park authority, the county development agency, and the soil and water conservation district.

"The agencies were really thankful," reported Gissendanner. "They didn't have the funds to hire additional employees and all of a sudden, these kids were popping up out of nowhere."

Gissendanner reported that at first, not all agencies were wholeheartedly enthusiastic about the Corps.

"Some agencies are doing very complicated testing and didn't believe that a bunch of high school students could do the job. They also had the impression that these kids weren't going to work.

"But I told them, 'These kids are regularly salaried employees. They're expected to work, and you can fire them.' I would always hear first thing, 'What can I expect from these kids?' and my answer was 'Anything you can expect from any other employee.' "

Gissendanner emphasized, however, that the FCYCC members were to work on worthwhile conservation projects and programs—not running out for coffee and sweeping the floor.

Throughout the summer, FCYCC members worked on a variety of jobs, including some sophisticated testing and monitoring: As examples:

- Two Corps members collected water samples from various points in the county and conducted water quality tests at the public works laboratory.
- One student inspected construction sites to check compliance with the county's sediment control law. Since the county only had one erosion control inspector, this student doubled the available inspection force during the peak construction months of summer.
- A task force working for the regional park authority inventoried an old railroad right-of-way to determine whether it could be converted into a linear park and bicycle path.
- Two FCYCC members originated and conducted rowboat tours of a marsh in Pohick Regional Park south of Mount Vernon as a graphic lesson in marsh ecology for people visiting the park.
- Several members worked at various parks repairing old trails and blazing new ones. Since professional trail managers earn as much as $16,000 a year, the work done would have been prohibitively expensive had it not been for the county Corps.
- Three members worked to restore a natural garden that had fallen into disrepair. "Fern Valley," the creation of scientists Paul and Elizabeth Bartsch, had at one time contained every species of fern but one found east of the Mississippi. The FCYCC members worked



Jon Mills and Karen Rutledge work on cleaning up Fern Valley.

by hand to restore much of the parklike beauty to the spot and to remove weeds and fallen logs.

By the end of the summer, a tremendous amount of work had been done, at a total cost to the county of less than $14,000 for all 20 FCYCC employees.

The county government was so impressed by the work done in 1973 by the FCYCC that it expanded the FCYCC program to 30 students for 10 weeks this year. The county assumed full responsibility for funding and organizing the Corps, and Mrs. Anne Blackburn, youth conservation consultant for the Northern Virginia Soil and Water Conservation District, selected the FCYCC members.

Among other ideas that the Youth Board came up with and put into action was the creation of a Youth Council.

The Youth Council had a goal of one representative from every high school in the county and in its first year had representatives from 16 out of 21 high schools. It provides the Youth Board with a broader base of ideas and provides young people in the county with more representation on environmental matters.

"We've testified as a group before several county ordinance hearings," Gissendanner said.

The Youth Council also sponsored a tree contest in historic Fairfax County, home of George Washington. The contest was to locate noteworthy trees in the county and had four categories: the largest trees in circumference, trees of unique quality, trees growing under extremely adverse conditions, and the most distinctive clump of noteworthy trees. The contest was an inexpensive way to inventory trees deserving special protection under the Fairfax County Tree Ordinance and to involve citizens in their county's environmental programs.

First and foremost, however, the Youth Council is a forum—a place where young people can come up with solid proposals and actions on ways to help improve and protect the environment.

This year the Youth Board program gained even more awards. The Youth Board received a chapter award from the Soil Conservation Society of America for its work "in developing projects and activities to promote soil and water conservation in Fairfax County," and Mrs. Blackburn received a national award from the Soil Conservation Society of America for her work in advancing environmental education among young people. ♦



Debi Miller (left) and Sheri Wiegert, both members of the Fairfax County Youth Conservation Corps, run laboratory tests on water samples they collected for research on two watersheds in Fairfax County, Virginia.

'Lathco' Flatpea Keeps 'Open Spaces'

by Robert D. Slayback and Sheridan I. Dronen
Plant materials specialist, SCS, Lockeford, California, and manager, Big Flats Plant Materials Center, SCS, Big Flats, New York

Utility line right-of-ways and woods access roads in the Northeast are quickly overcome by invading woody plants. Can such areas be kept "open" with 'Lathco' flatpea?

Results from trial plantings in five states—Pennsylvania, New York, Vermont, New Hampshire, and Maine—show that they can. Developed for its excellent conservation cover, 'Lathco' flatpea has proved to have the additional value of suppressing native vegetation.



'Lathco' flatpea, seeded on this steep pipeline right-of-way in the Clinton County Soil and Water Conservation District in Pennsylvania, shows its excellence as an erosion cover that excludes native woody vegetation.

Released in 1972 by the Soil Conservation Service, Cornell University, and Penn State, 'Lathco' flatpea has shown a number of assets as a conservation plant. It suppresses native trees, vines, shrubs, and weedy vegetation along roadbanks, dam slopes, gravel pits, logging roads, minespoil, and utility right-of-ways. Its deep rooting habits and above-ground mat of vegetation make it the equal of crownvetch in conservation value. It performs well on a wide variety of soil conditions and can protect and make useful sand, gravel, and shale sites that are dry and infertile. However, 'Lathco' flatpea does not respond well in soils that have poor drainage or a pH below 5.

Here are some samples from trial plantings of 'Lathco' flatpea in the Northeast:

• In Carroll County, New Hampshire, 'Lathco' flatpea was seeded in 1967 along a road in the woods on Forest Service land. Almost no invasion of native woody plants has occurred there. Deer use the planting heavily for both bedding and browsing.

The adjacent area that was not seeded has grown over with native woody plants and is almost impenetrable after being abandoned for 7 years.

• In Clinton County, Pennsylvania, 'Lathco' flatpea was planted on a very steep slope of a pipeline right-of-way. It has developed an excellent cover and smothered all volunteer woody vegetation in the planted area. It is the ability of 'Lathco' flatpea to retard woody invasion that has interested utility companies in this plant.

• In Lewis County in northern New York, several highways display the rose-colored flowers of 'Lathco' flatpea in early summer. These trial plantings have demonstrated excellent erosion control and beautification on otherwise droughty, eroding roadbanks, while at the same time preventing the encroachment of unwanted trees, shrubs, briars, and vines.

Trial plantings have also shown that areas kept open by 'Lathco' flatpea are used extensively by wildlife. In trials on Pennsylvania Game Commission lands, deer preferred to graze and bed down in 'Lathco' flatpea plots over other grass and legume plots.

Several states are now evaluating the use of 'Lathco' flatpea by specific wildlife.

One of the questions frequently asked by potential

(continued on p. 21)

A City Saves Its Water Supply

by Dennis Grundel
District conservationist, SCS, Chariton, Iowa

When good water is hard to find, you do what you can to keep what you have. That's the theory behind a plan at Chariton, Iowa, to prolong the life of Lake Morris, the city water supply.

More than a fourth of the lake's water capacity has been lost through siltation since the lake was built in 1941. Organic matter has stimulated algae growth in the lake's upper reaches. In this area the shoreline has moved inward 700 feet due to silt deposits. Purification costs are high.

The problem is particularly serious for the 5,000 people in this southern Iowa city because alternatives for water supply are limited. A well would need to be half a mile deep, and well water in this area isn't easily purified. With no acceptable streams or rivers nearby, surface water from reservoirs is the only logical choice.

City officials plan to save the lake—which would cost an estimated $700,000 to replace—by building six small earth dams and undertaking other conservation measures within the lake's drainage area. These efforts are to control sheet and gully erosion and trap and keep most sediment out of the lake. The dams, now under construction, will be completed by the end of the year, with total construction cost at $160,000.

City manager Bernie Aulwes estimates the city will save $8,000 each year in the operation of the city water treatment plant due to the reduced need for chemical treatment, filter cleaning, and maintenance, and due to greater overall efficiency in the treatment plant.

Conservation practices will also keep soil on uplands and eliminate annual gully erosion costs of $1,000.

The plan is being sponsored by the City of Chariton, Lucas County Soil Conservation District, and Chariton Water Board as part of the Chariton Valley Resource Conservation and Development (RC&D) project. Local sponsors secured easements for the dams, and the Soil Conservation Service provided engineering and technical help. Cost of the six dams is being paid with RC&D funds through SCS. ♦



Lake Morris, the city water supply for Chariton, Iowa, has lost a fourth of its water capacity due to sedimentation.



'Bandera' Rocky Mountain penstemon, native to the Southwest, has showy blue flowers that make it popular for roadside plantings and growth habits that make it a good stabilizer for slopes.

New Plantings for the Southwest

by Dan Merkel and Dick Barber
Plant materials specialist and public information officer, SCS, Albuquerque, New Mexico

A difficult job in a difficult climate.

That sums up the work of the Los Lunas, New Mexico, Plant Materials Center of the Soil Conservation Service.

Plant materials specialists there put top priority on developing new plant varieties and improving planting techniques for erosion control in the Southwest, where "normal" climatic conditions mean low rainfall, drought, high wind, and low humidity.

Add to the hurdle of climate a second one: more intensive land use brought on by a growing population.

Work at the Los Lunas Plant Materials Center is a cooperative effort, involving not only the Soil Conservation Service but also the New Mexico and Colorado State Universities, the New Mexico State Highway Department, and the Forest Service.

To date, the Center has released 16 new plant varieties and 12 others are in the final testing stage. Its work has done much to make plantings of trees, shrubs, and grasses a success in the Southwest.

The Center tests new varieties and planting techniques on such sites as roadsides, processed oil shale, urban areas, and rangeland.

Its selection requirements are rigid. Among those new varieties that the Center has released are 'Bandera' Rocky Mountain penstemon, a native plant whose growth habits, both root and crown, make it a good stabilizer for slopes. Its showy blue flowers make it popular for roadside plantings. In addition, its abundant seed crops are easy to harvest, clean, and plant.

The seed of this plant was collected in 1964 from Rocky Mountain penstemon plants in the Cibola National Forest, northwest of Mountainair, New Mexico. The original seed source is in the Ponderosa Pine Zone, with an elevation of about 7,400 feet and an annual rainfall of 16 to 18 inches. At the Center, 'Bandera' Rocky Mountain penstemon showed good results in trial plantings.

Among other plants released by the Center are 'Arriba' western wheatgrass, 'Paloma' Indian ricegrass, and 'Pink Lady' winterberry euonymus. Both 'Arriba' western wheatgrass and 'Paloma' Indian ricegrass were selected because of high seed production and superior forage production and vigor. 'Pink Lady' winterberry euonymus, evaluated for use in windbreaks, wildlife habitat, and beautification, was selected for release for its value in landscaping. The New Mexico State Highway Department assisted in its selection and expects to use the colorful and hardy plant for roadside plantings. ♦

Wild Turkeys Return to Illinois County...

by Russell Sass
District conservationist, SCS, Hardin, Illinois

On a wintery cold day this past February, the wild turkey made its return, after nearly 75 years, to Calhoun County in western Illinois.

In all, seven wild turkeys—five hens and two gobblers—were released that day into the Two Rivers Resource Conservation and Development (RC&D) Project Area in Calhoun County.

Three weeks later, they were joined by seven more hens. All of the turkeys had been trapped 150 miles away in the Shawnee National Forest and rushed to the release area.

The reestablishment of wild turkeys is one of the objectives undertaken by the recreation, tourism, and wildlife committee of the Two Rivers RC&D Project. Organized in 1971 in western Illinois, the RC&D Project area includes five counties: Calhoun, Adams, Schuyler, Brown, and Pike.

The first step the committee took in the turkey project was to bring in Rex Hamilton, wildlife biologist with the Soil Conservation Service, to determine if the area had a suitable habitat. Hamilton, who had worked with stocking wild turkeys in Indiana, informed the committee suitable habitat did exist, particularly in Calhoun County.

Next, the committee con-



Jack Calhoun, chief forest game biologist with the Illinois Department of Conservation, holds one of the wild turkeys just prior to its release.

...With Help From RC&D Committee

tacted the Illinois Department of Conservation and met with its chief forest game biologist, Jack Calhoun. Although interested in the committee's activities, Calhoun indicated the state would probably not be ready to stock birds on private land for some years to come.

Stocking turkeys on private land is a complicated undertaking, since the turkeys range widely and require several thousand acres of continuous habitat. The state had successfully reintroduced wild turkeys into the Shawnee National Forest in southern Illinois, where the Illinois Department of Conservation had a trapping program to get the birds established throughout the forest.

Not discouraged, committee members continued to build up local support for the project. They obtained the written support of all the landowners on a 6,000-acre tract of prime turkey habitat.

The big break came last year, when Calhoun contacted the RC&D Project office to meet with the committee again and take a firsthand look at the proposed site.

Committee members provided Calhoun with a guided tour and furnished aerial photos of the area. Calhoun was accompanied on the tour by Jerry Garver, biologist with the state conservation department and the man in charge of the turkey program in the Shawnee National Forest, and by Gene Stumpf, conservation officer for Calhoun County.

The men from the conservation department liked what they saw and heard. They reported they were ready to make an experimental release in the Two Rivers RC&D Project Area—and that led to the release of the seven turkeys on February 23.

Not since shortly after the turn of the century had a wild turkey roamed this county between the Illinois and Mississippi Rivers.

Early settlers had found game abundant in the heavily forested hills and river bottoms. At first easy prey, the turkey learned the ways of the hunter and became progressively harder to hunt.

He couldn't, however, escape the landclearing effects of the ax and the crosscut saw. With remarkable swiftness, the pioneers cut down large trees for lumber for homes, barns, and firewood. Forests were converted to cultivated fields, pastures and orchards. And the turkey found his habitat rapidly disappearing.

By the early 1960's, though, wildlife enthusiasts felt that the county could once again support these majestic game birds.

The great hardwood forests were slowly returning. Agriculture in the county had diminished as larger and more sophisticated machinery made much of the marginal land impractical to farm. Both the number of farms and the number of residents had steadily decreased. The hardwood timber industry became depressed and people began to look more to the esthetic values of their woodlands.

However, stocking these woods with wild turkeys proved to be difficult. Game farm stock proved unsatisfactory. The pen-reared birds inevitably turned up in feedlots with domestic livestock and ultimately wound up in roasting pans. The only successful means of reestablishing truly wild turkeys was to live trap them and release them immediately in new locations—which is what has happened in western Illinois.

To the delight of sportsmen and nature lovers alike, the gobbling of the courting tom is again echoing across the ridges and down the wooded hollows of Calhoun County. ♦

An Interview With Dr. Robin Vannote

'Trees...Play a Critical Role in P

by Jane Hill
Information Division, SCS, Washington, D.C.

Dr. Robin Vannote, a stream and river ecologist, is director of the Stroud Water Research Center, one of the few places in the country where the ecology of streams in agricultural basins is being studied.

Known to the Soil Conservation Service for his contribution to the "Report on Channel Modifications" prepared as part of a report last year to the Council on Environmental Quality, Dr. Vannote spoke last April and June to SCS administrative personnel at three environmental short courses held at the University of Georgia's Institute of Ecology. His talks there led to the interview featured in this issue.

Dr. Vannote is particularly noted for his unique combination of field and lab work. He has done the best job of any scientist so far of moving a living stream into a laboratory. A section of the stream is transferred intact to experimental flow-through streams in the lab; algae and most forms of stream life colonize the lab streams as the water is piped in from a natural stream and retains the same temperature and velocity that it occurs in nature. Leaves, grass, and forest canopy insects are added to the lab streams in the same numbers that they fall into the stream outside the laboratory. With his stream replica, Dr. Vannote is able to alter light, available food, sediment, plant and animal life, among other factors, and find out what happens to the stream.

The Stroud Center, a field research laboratory of the Academy of Natural Sciences of Philadelphia, is in a rural area in southeastern Pennsylvania. There, for the last 6 years, the staff has been studying the ecology of White Clay Creek, which traverses a 1,800-acre agricultural basin 50 miles from Philadelphia.

"A forest buffer along streambanks is of great value to stream life. Many organisms in crucial stream food chains depend on trees."

That statement—from Dr. Robin Vannote at an environmental short course for the Soil Con-



Dr. Robin Vannote examines one of the experimental str White Clay Creek in southeastern Pennsylvania. Experime various kinds of landscape changes and runoff associated

ocesses Within the Stream Itself'

servation Service earlier this year—raised questions as to how he arrived at that conclusion.

Later, in an interview at the Stroud Water Research Center where he directs research both in the lab and along the White Clay Creek, Dr. Vannote elaborated on his statement.

"People used to reforest streambanks or leave greenbelts for esthetic reasons or for cover for certain kinds of wildlife or to prevent erosion,"



s, which use water pumped from the nearby l streams are used to study the effect on stream life of n farming.

Dr. Vannote said. "This is good.

"But we've learned in the past year or two that trees play a critical role in processes within the stream itself. For instance, autumn leaves that fall or blow from the forest floor into the stream may provide a substantial part of a stream's energy."

The tree canopy also provides cooling shade and protects the stream from high light intensity that could, if coupled with luxury amounts of organic nutrients such as nitrates and phosphates, promote the growth of undesirable kinds of algae. And trees may reduce the concentrations of nutrients in the stream in several ways.

"But," Dr. Vannote warned, "retaining or reestablishing a tree fringe is only one part of repairing an abused landscape and optimizing stream production. You can't just plant some trees along a polluted stream and expect fish to leap into your lap."

Underlying much of Dr. Vannote's recent work is the idea, developed by the Stroud Center in the last year, that a stream ecosystem forms a continuum from headwaters to downstream river waters.

On headwaters and other small streams high in upland watersheds, the channels are narrow enough for the tree canopy on the two banks to meet over the water and shade out most of the sunlight. Then, as these small streams come together to form larger ones, the channels widen progressively and the canopy on the two sides separates, allowing more light to penetrate.

"These small-to-medium sized streams are the ones SCS is most concerned with in its small watershed program. And these are the most vulnerable to landscape changes," Dr. Vannote said.

In the highly shaded upland streams, 75 percent or more of the nutritional, or energy, base may be supplied by large-particle "detritus," which is dead organic matter, mostly tree limbs, leaves, and insects that fall into the water. As the canopy separates and light intensity increases, photosynthesizing green plants gradually become an important energy base, and large-

particle detritus less important.

On large rivers, leaf litter and shade from trees become of relatively minor importance because there are few trees in relation to the amount of water. The river bottom is usually too deep or the water too turbid for light to penetrate and cause photosynthesis. As a result, rivers depend for energy mainly on the transport of algae and fine-particled remnants of the leaves and insects processed upstream.

As particle size follows a gradient from headwaters to larger downstream waters, the kinds of detritus processors vary as well, according to Dr. Vannote. Insects and crustaceans, the primary processors, are specialized in upstream reaches for shredding leaves because of cool temperatures and the relative abundance of leaves in the smaller streams. As streams become progressively larger, another kind of processor, the "collector," becomes common. This animal can harvest and process the fine particles swept downstream after partial breakdown by the "leaf shredders."

"The farther upstream you go, the more abundant are the leaf shredders and the more necessary are tree fringes," Dr. Vannote said.

"The leaf shredders are favored not only by the large number of fallen leaves in proportion to the amount of water in these areas, but by other conditions as well."

The shade provided by the tree canopy keeps the stream from heating up during the day. This constant coolness allows the detritus-processing animals to work all year round. They are also aided by a large number of "sticky traps"—snags, rocks, branches hanging into the water, and other structures that hold the detritus particles in the system until the processors have a chance to work on them.

Further downstream, where the canopy parts, the water may heat up more during the day, the current may be swifter, and the number of



Dr. Vannote checks one of the malaise traps used to collect flying insects emerging along White Clay Creek near the Stroud Water Research Center.

sticky traps fewer. There, leaf shredders must work mainly during and shortly after the autumn leaf fall, before the particles are flushed out. The rest of the year, under natural conditions, the energy base of these streams is mainly detritus fines transported from upstream and photosynthesis by a kind of algae called diatoms.

"If trees are removed from the banks of headwater and small upland streams, the entire stream system can be affected," Dr. Vannote said.

"For instance, the reduction in detritus upstream will not only affect leaf shredders there, but will also have repercussions downstream, where fine-particle collectors will not get enough to eat."

But leaf shredders and collectors are not the only stream animals to be affected by changes in stream conditions.

"In an upland stream, many organisms are adapted to cool temperatures and respond adversely to elevated temperatures or, perhaps more importantly, to temperature fluctuations," Dr. Vannote said.

"For instance, as the temperature of a cool stream starts to fluctuate more widely, brook trout may eventually be replaced by smallmouth bass. The bass may then be replaced by suckers and minnows. Finally, suckers may give way to carp as the stream continues to warm up. Many a trout stream has gone this route.

"This sequence can be traced to four major steps in the evolution of a watershed from natural to rural agricultural to suburban to urban areas," Dr. Vannote continued.

At each of these stages, life in the stream quickly reaches a new equilibrium.

First, trees are removed for farming or houses, and the stream warms up. Second, the stream becomes more turbid as the disturbed soil is washed into the water. Turbid water heats up faster than nonturbid, and, although total fish production may increase under these conditions, cold-water fish may be injured. Third, as agricultural activity increases, the amount of nutrients—carried by rainfall runoff or ground water from fertilized fields and livestock operations—increases. And fourth, drainage ditches, which are often a part of agricultural land use, cause cool ground water to be brought to the surface and warmed by the sun. This warmed water, flowing into the stream, passes on its heat.

Besides increasing stream temperatures, a lack of trees may let too much light strike the water. High light intensity, when combined with luxury amounts of plant nutrients contained in treated sewage or in runoff from farms, encourages the growth of undesirable plants at the expense of plants beneficial to other stream organisms, such as fish. The leafy weeds and filamentous green and blue-green algae that may proliferate under these nutrient and light conditions disrupt the food chain of the stream because few animals eat them.

At the same time, these plants compete for trace nutrients and space needed by diatoms, algae that are considered beneficial because insects depend heavily on them as a food source. Insects, in turn, are important because they are a major food source for fish.

Perhaps less obvious than the relation between light levels in a stream and tree canopy is the relation between trees and nutrient levels in the water. Trees can reduce nutrient levels in three ways, according to Dr. Vannote.

First, certain nutrients that travel overland attached to soil particles in rainfall runoff may be trapped by sedimentation in a forest greenbelt before reaching the stream. Second, the tree roots may take up some of the stream's nutrients directly. And third, certain micro-organisms—bacteria and fungi—that play a part in breaking down detritus take some of the nutrients out of solution during the decomposition process.

"One way to lessen the impact of nutrients on a stream is to plant shade trees to shield the stream from excessive light," he said. "Trees should have two major effects. The decreased light reaching a tree-shaded stream will favor the production of diatoms and thus help restore the stream's normal equilibrium. And the detritus provided by the leaves entering the water will attract micro-organisms that take nutrients out of solution.

"Tree planting should be coupled with nutrient management on the farm to minimize the nutrient flow into streams," Dr. Vannote said.

Using slow-release nitrogen fertilizers should help prevent nitrates from traveling via the ground water into the stream. And timing fertilizer applications to coincide with maximum plant demand can save fertilizer (a plus in these energy-short days) and help spare streams the burden of excess nutrients.

Which trees are best to plant?

"A mixture of species is most useful," he said. The palates of stream animals should be one consideration in selecting trees. The larvae of some caddisflies prefer to eat hickory, tulip poplar, and maple, mainly because these leaves easily support the fungi and bacteria that must first condition the leaves before the larvae can

process them. On the other hand, for building their portable-case houses, these caddisflies choose beech and oak leaves, which are more durable and slower to be broken down.

Different tree species begin to shed their leaves at different times and continue to shed them over varying lengths of time. This means that planting a diversity of species will help insure that leaves are available for processing over a longer period of time, since leaves and other stream debris are periodically flushed out by storms. For instance, if only beech and red oak are planted, the great majority of the leaves will fall during a 2-week period. If a variety of trees is planted, the leaf-shed period will be significantly longer.

In addition, planting only one or two species may give disease an opportunity to wipe out the whole stand.

Eastern deciduous species that are strongly preferred by various stream animals for food or shelter—and therefore good choices—include maple, alder, hickory, ash, basswood, oak, and beech. In other areas of the country, of course, other species should be chosen.

Dr. Vannote emphasized that "Arbor Day-style" planting of one or two clumps of trees probably will not help the stream's ecology significantly. "There must be a real greenbelt," he said.

Planting trees on only one side of a stream would be of some benefit. "It might do half the job of supplying shade and detritus, depending on physical conditions in the channel, and, if strategically placed as to orientation toward the sun, probably would help the temperature and light problems, but it's hard to say how much," he said.

Dr. Vannote and his staff are testing the hypothesis that reestablishing a forest buffer will help restore natural conditions in a stream. They've planted a greenbelt along a section of creek that harbors considerable filamentous algae. When the stand begins to provide shade in several years, they will compare this section of stream with a natural woodland-meadow section to find an optimum mix of light and shade.

"We expect the shade to favor diatoms over filamentous green and blue-green algae," he remarked. ♦



Staff-designed "fall-in" trays along White Clay Creek measure litter input from forest canopy fallout and blow-in from the forest floor.

SCS Helps Establish Outdoor Nature Area At East Louisiana State Mental Hospital

by Gene Warren
Information specialist, SCS, Alexandria, Louisiana

Motivation sounds big—and it is. It is the objective of the East Louisiana State Mental Hospital at Jackson, Louisiana, when the staff urges patients to use their new outdoor nature area.

"We feel that planned outdoor activities will do much to bring our patients in touch with the world and with reality . . . and to increase their sense of belonging," said Mrs. Holly Reynolds, director of recreational therapy at the 1,500-patient hospital.

The outdoor area encompasses about 20 acres of the hospital's property. It is within walking distance for most of the patients, although some will need transportation.

The outdoor project began when Mrs. Reynolds, a veteran in recreational therapy with the mentally ill, talked to Terry Smith, Soil Conservation Service district conservationist at Clinton, Louisiana.

"I had read how SCS and soil and water conservation districts helped schools to plan outdoor classrooms, and it struck me that the same principle would apply to our patients here," Mrs. Reynolds said.

Late in 1973 SCS met with several hospital officials and outlined ideas. "From then on the project was easy sledding," Smith said.

The project area lies about 700 feet from the main recreation building on the hospital grounds. A series of trails have been set up, both for short and long walks, depending on the capability of the patients. Trees, plants, and shrubs along the trails are identified. At several spots, patients can stop and rest and listen to the sounds of nature; two sites are designed for picnicking. Other features planned include gardening areas, birdbaths and feeders, and a bluff where a 30-foot soil profile is exposed so tree and other roots can be seen growing.



District Conservationist Terry Smith, accompanied by Kathryn Gayle, recreation therapist at the East Louisiana State Mental Hospital, tags a cottonwood tree along a trail at the new nature area at the hospital.

Patients first began to use the nature area early this summer. But hospital officials say it will be the end of the year before things get in full swing.

Kathryn Gayle, a recreation therapist at the hospital, says that more than half of the 1,500 patients will benefit from the nature area each year.

"When you get right down to it, our real mission in this project, as well as others at the hospital, is to make the patients' stay beneficial until they are ready to go home," Mrs. Reynolds said. "All of us here who have worked with the outdoor project feel that involving patients in outdoor activities is a major way to accomplish that mission." ♦

Watershed Project Sponsors Seed Newly Constructed Ditchbanks

by James M. Winston
Area conservationist, SCS, Crowley, Louisiana

A plane swoops by . . . and another ditchbank has been seeded.

The site is in south Louisiana, where a concentrated effort by watershed project sponsors is underway to seed newly constructed ditchbanks. The result is higher quality water runoff—with less silt and pollution—as well as longer life spans and less maintenance for the ditches themselves.

Because of the flat terrain and high rainfall—around 60 inches a year—many of south Louisiana's watershed projects involve ditches—both for drainage and for flood control.

These newly constructed ditches can cause a temporary erosion problem. That's why sponsors of watershed projects are involved in a seeding program.

More than 47 miles of newly constructed ditches were seeded last year in Evangeline Parish, according to District Conservationist Bennett Landreneau at Ville Platte. And in Iberia Parish, District Conservationist Dolan Kleinpeter reported about 40 miles of watershed ditches have been seeded.

Tall fescue, bahiagrass, and bermudagrasses are commonly used on watershed ditches in Iberia Parish. Kleinpeter said common bermudagrass has been the most dependable warm season plant for controlling erosion along the ditches. Plants with larger seed have not been as successful because they require soil cover for good germination.

'When you get 5 feet of rainfall a year, it is essential that you lose as little time as possible in revegetating disturbed areas after construction. Last year, we received about 90 inches of rain . . .'

In Evangeline Parish, ryegrass and tall fescue are commonly used on the ditchbanks and spoil bank areas. These plants, seeded in the fall, provide cover 4 to 6 months sooner than natural vegetation, Landreneau estimated. Most of the seeding is done by airplane, and is applied to slopes, berm, and unspread spoil for an average width of 65 to 75 feet on each side of the channel.

Ryegrass will grow an inch in 8 to 10 days after seeding, and the district has had successful seedings as late as December 27, Landreneau said. Both ryegrass and tall fescue cling to the soil on the steep slopes and establish well without a mulch cover. Mature ryegrass also makes an excellent mulch in which native plants can get started.

The Evangeline Parish Policy Jury—the local governing body—and the Evangeline Soil and Water Conservation District sponsor three small watershed projects covering 420,000 acres, and they work closely to see that channels are seeded with grasses immediately after construction in order to minimize erosion.

"Our climate is excellent for natural revegetation most of the time," said Earl John Soileau, president of the Evangeline Parish Policy Jury. "But when you get 5 feet of rainfall a year, it is essential that you lose as little time as possible in revegetating disturbed areas after construction. Last year, we received about 90 inches of rain, so you can see our problem." ♦

At right, a plane seeds a newly constructed ditch in Evangeline Parish, Louisiana. That was last January. By May, District Conservationist Bennett Landreneau was walking through thick cover.







Boy Scouts and their leaders are developing a former strip-mining area near Sheridan, Wyoming, into the Kleenburn Boy Scout Camp.

Campfires Atop Spoil Piles

Boy Scouts Tackle Strip-Mined Area; Create 100-Acre Campsite in Wyoming

by David C. Graunke
Civil engineering technician, SCS, Sheridan, Wyoming

Named after a mining town of yesteryear, Kleenburn Boy Scout Camp was born when 100 acres of strip-mined land were leased to the Central Wyoming Boy Scout Council.

The clear waters and plentiful fish of two 10-acre lakes and the Tongue River give the acreage recreation appeal. But high mine dumps, low lands, and piles of coal slack characterize the terrain. Nature, working practically alone to recover the land for 20 years, has revegetated the area in varying degrees.

Why would the Boy Scouts care to place a new camp in an old strip mine requiring lots of manpower and boy power to make it usable?

The reason is that besides teaching conservation, brotherhood, and outdoor activity skills, the Boy Scouts of America could also be described as a conservation organization. Boys are encouraged to earn environment and conservation skill awards. Soil and Water Conservation, Nature, Fish and Wildlife Management, Environmental Science, and Forestry are found among Boy Scout Merit Badges.

Coal has been strip mined near the northern Wyoming community of Sheridan since the early 1950's. The tract of land leased to the Boy Scouts by the Sheridan County Recrea-

tion Board had been donated to the county by Homer Scott of the Padlock Ranch. One of the terms of the lease required that a camp plan be prepared and approved before steps could be taken to reclaim the land.

A camp development committee was formed and its members requested help from the Clear Water Conservation District. Inevitably, Kleenburn Boy Scout Camp became a district cooperator.

The real planning process began when soil scientists prepared a soil capability map. Soils information enabled the development committee to locate latrine sites, access roads, and topsoil to place on sterile areas. A land use map with overlays showing contour lines, tree and brush locations, and proposed improvements was also provided by the Soil Conservation Service.

No money was available for the development, but the committee had no trouble securing support from the citizens of Sheridan. City and county crews built the access road. Privies, lumber and hardware for picnic tables, culverts for drainage, and grass seed were donated by interested merchants. Heavy equipment for grading the steep slopes was made available by the Big Horn Coal Company that originally mined the area. A well was drilled by a coal contractor. The Army Reserve Unit trimmed large trees.

On hand to do the engineering design and layout on the access road, land grading, and drainage system were SCS technicians who also supervised installation of the well and located permanent campsites.

Care was taken not to overdevelop and lose the primitive atmosphere that made the area so appealing for a Scout camp. Year-round camping is now possible at Kleenburn.

Conservation projects for boys abound. Evening campfire ceremonies are held high atop spoil piles. Trails need to be built on the contour of the top and to act as diversion for water runoff. Boys are busy seeding grass and planting trees on the spoil piles. Streambank spoil piles for easy access to the stabilization work is needed along the Tongue River, which is being stocked with fish. Nature trails are being built.

Young boys, not yet Scouts, will be able to take part in the reclamation because items in the development plan are scheduled over a period of several years.

To learn by doing can have a profound impression upon young Scouts. These boys will remember, for a lifetime, their special part in reclaiming strip-mined lands of the West. ♦

Science Teachers To See SCS Multimedia Shows

The Soil Conservation Service will show its multimedia production at the National Science Teachers Association Conference in Washington, D.C., on November 23.

The three shows—"A Special Genius," "Underfoot," and "Circle of Life"—graphically depict the work of the SCS in helping people improve their environment.

"A Special Genius" concentrates on what people, individually and in groups, rural and urban, are doing through soil conservation districts to protect and improve the natural resource base.

"Underfoot" is the story of soil—its use and misuse and how land use problems are being met through the use of soil surveys.

"Circle of Life" takes a look at the beauty and bounty of the countryside through the poetic works of Nobel Prize winner Rabindranath Tagore.

The presentations are available for showing before large national groups of an environmental, wildlife, or educational nature, according to Hubert Kelley, SCS information director. ♦

'Lathco' Flatpea Keeps 'Open Spaces'

(continued from p. 7)

users, faced with high labor costs and shortage of fertilizer, is: "Is 'Lathco' flatpea a low-maintenance plant?" Lime and fertilizer are needed to establish 'Lathco' flatpea on acid infertile sites, but no followup maintenance is required. On a rocky roadbank in New Hampshire, after 23 years, a planting of flatpea continues to show excellent vigor and competitive cover.

In addition to its other uses, 'Lathco' flatpea has also shown promise in increasing forage production on low fertility soils. It has a high protein content and has been used for pastures in the Pacific Northwest and in Canada.

No problems have developed in controlling the plant. It has invaded areas only where it was seeded.

'Lathco' flatpea seed was available from several seed producers in Pennsylvania this year, and more production is expected from new growers. The high demand for seed should continue as we increase the quality of our environment through use of this prime conservation plant. ♦

Recon . . .

Ponds are for baptisms, too. "Soil conservation ponds are certainly utilitarian," reports Frances S. Bond, the first woman to be elected a county soil conservation supervisor in Vermont.

She offered her pond to a nearby Baptist church, which had no indoor facilities for baptism. More than 100 people sat on the banks of the pond last July during a service at which 11 persons were baptized.

Mrs. Bond is secretary and treasurer of the Windham County Natural Resources Conservation District.



The farm scene aboard American Airline's 727's.

Conservation takes to the skies. When conservationists have gotten together lately at meetings, there's been quite a bit of comment about contour stripcropping aboard American Airlines.

It seems American has just finished installing realistic farm scene tapestries on its 727's—about 100 in all. The tapestries stand some 7 feet tall and cover the first class bulkhead.

A check with the design firm brings the information that the scene is derived from aerial photographs of an actual farm in the Midwest.

The colorful tapestries represent "photo realism," a new, current art form, the firm said. It has taken about a year to install them aboard all the airline's 727's, with the last one put in place in July, according to American.

Stars and strips. Looking at a Skylab satellite photo, a graduate student in geography at South Dakota State University spotted what appeared to be a mile-long replica of the U.S. flag on a farm in western South Dakota.

The photo was taken from 250 miles up. Checking it out, the student found that at ground level, the "stripes" were strips of winter wheat and fallow land and the "stars," a 60-acre field of alfalfa.

The flag pattern was even a surprise to its owner, Rex Gorr, who has received a number of certificates of merit from the Eastern Pennington County Soil Conservation District for outstanding accomplishment in soil conservation.

Soil surveys

Alabama

Clay County. By Robert B. McNutt, Lawson D. Spivey, Jr., and Jarrell F. Austin. 1974. Soil Conservation Service and Forest Service in cooperation with Alabama Department of Agriculture and Industries and Alabama Agricultural Experiment Station. 46 pp., illus.; maps.

Michigan

Shiawassee County. By George W. Threlkeld and James E. Feenstra. 1974. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station. 113 pp., illus.; maps.

Oklahoma

Coal County. By Gordon E. Moebius, Lyle C. Shingleton, and Vinson A. Bogard. 1974. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 60 pp., illus.; maps.

Pennsylvania

Northampton County. By Larry R. Staley. 1974. Soil Conservation Service in cooperation with The Pennsylvania State University, College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission. 120 pp., illus.; maps.

Virginia

Charlotte County. By John W. Van Dine and William F. Sledjeski. 1974. Soil Conservation Service in cooperation with Virginia Polytechnic Institute and State University. 97 pp., illus.; maps.

Meetings

October

21–25	*Association of Engineering Geologist, Denver, Colo.*
21–25	*American Society of Civil Engineers, Kansas City, Mo.*
22–24	*National Coal Association, Louisville, Ky.*
23–26	*National Council for Geographic Education, Chicago, Ill.*
27–30	*Sprinkler Irrigation Association, Lake Buena Vista, Fla.*
28–30	*American Plywood Association, Houston, Tex.*
30–31	*American Forest Institute, Portland, Oreg.*
31–Nov. 1	*American Association for Vacational Instructional Materials, Atlanta, Ga.*

November

1	*Environment and Safety Briefing Session, Loew's L'Enfant Plaza Hotel, Washington, D.C.*
4–8	*Adult Education Association of the U.S.A., Miami Beach Fla.*
5	*American Seed Trade Association Conference, Kansas City, Mo.*
10–13	*American Bankers Association National Agricultural and Rural Affairs Conference, St. Louis, Mo.*
10–15	*Joint Meeting of American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America, Chicago, Ill.*
11–15	*National Water Resources Association, Fresno, Calif.*
11–18	*National Grange, Sacramento, Calif.*
13–14	*Thirteenth Annual Purdue Air Quality Conference, Indianapolis, Ind.*
18–20	*Geological Society of America, Miami Beach, Fla.*
18–20	*American Association of State Highway Officials and Transportation Officials, Detroit, Mich.*
18–20	*National Association of Land Grant Universities and State Colleges, Washington, D.C.*
18–22	*Tenth American Water Resources Conference, Puerto Rico*
19–23	*Park Interpreters' Institute, Texas A&M University, College Station, Tex.*
20–22	*American Forest Institute, Boston, Mass.*

December

1–3	*American Society of Farm Managers and Rural Appraisers, Inc., Convention and Trade Show, Omaha, Nebr.*
1–5	*American Institute of Chemical Engineers, Washington, D.C.*
3–6	*Western Forestry and Conservation Association, Spokane, Wash.*
5–6	*National Association of Manufacturers, New York, N.Y.*
10–13	*American Society of Agricultural Engineers, Chicago, Ill.*
12–17	*American Geophysical Union, San Francisco, Calif.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

CORE LIST

S33 Reserve

SOIL conservation

U. S. Department of Agriculture
Soil Conservation Service
November 1974



U.S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY
CURRENT SERIAL RECORDS

From the Administrator

Speeding Up Soil Surveys

Several years ago in Texas, a developer decided to build a new town on 18,000 acres. He would not start development plans, however, until he had a detailed soil survey by the Soil Conservation Service. The high intensity soil survey which he wanted—and which he paid for—was at a scale of 1 inch equals 500 feet and took 16 months to complete.

That's just one example of how important soil surveys are . . . and how much they are wanted and needed in areas of land-use change.

A major priority goal for the Service in the years immediately ahead is to speed up the process of mapping soils, interpreting the information, and publishing it in forms that decision makers can use.

We especially need to accelerate soil surveys wherever there are plans for major changes in the use of land that may be irreversible or may endanger the quality of the environment.

With each day, private citizens and administrators in cities and in rural areas are seeking information from soil surveys for the selection of sites for waste disposal, homes, buildings, and recreation. With food running critically short and land being plowed up, surveys are needed for selecting the best land that can be used safely for the best yields and also for determining what measures are needed to provide the protection that may be needed.

With limited manpower, we need to explore all possible ways to get soil surveys done—interagency agreements, transfers under the Intergovernmental Personnel Act of 1970, funds from other agencies, whatever it takes. We also need to take advantage of technology—high quality photographs, remote sensing, advanced equipment.

State and local governments and other nonfederal groups that use soil surveys are beginning to share substantially in the cost of them by participating in survey work, by trust fund agreements, or by reimbursing SCS. In fiscal 1973, contributions of funds and services from nonfederal sources for soil surveys totaled nearly $4.7 million. We have 136 cooperative agreements now with state and local agencies to provide funds to accelerate survey work.

This last fiscal year, we published a record 80 soil surveys, and we hope to publish 150 surveys a year by 1977. We published 402 special soil reports, including interim reports.

Communities are having to make land-use decisions fast—and we want to help them choose wisely.

Kenneth E. Grant

SOIL conservation

Contents

2 From the Administrator

4 Seventy-Five Years of the Soil Survey
Vincent J. Price

8 Soil Survey and Tax Assessment
Earl C. Nance

9 New Brochures Answer Questions on Soil Surveys

10 Soil Survey Helps Protect Water Supply
Bryce W. McEwen

12 The (Soil Survey) Buck Stops Here

15 Field Kit Provides On-the-Spot Solutions
C. M. Thompson, C. L. Girdner, and George Holmgren

16 Dr. Kellogg Named Honorary Member of International Society of Soil Science

17 A New Role for Connecticut Soil Scientists
David Lavine and Edward H. Sautter

18 An ERTS-Based Land Resource Inventory For Mexico's National Water Study
A. A. Klingebiel and Victor I. Myers

21 Computer Codes Montana Soil Data
Jack W. Rogers and Dr. Gerald A. Nielsen

22 Undaunted . . . They Did Their Own Inventory
Jonathan P. Edwards

23 Reviews

23 Soil Surveys

24 Meetings

November 1974, Vol. 40, No. 4

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$5.65 per year, $7.10 foreign. Single copy, 50 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

COVER: At SCS offices in Hyattsville, Maryland, Leo Ausilio checks aerial photographs for a soil survey. See photo story on p. 12.

Seventy-Five Years of the Soil Survey

by Vincent J. Price
Information Division, SCS, Washington, D.C.

"In the opinion of the Secretary of Agriculture," the President of the United States told Congress, "this is the most important work of its kind ever undertaken."

The Secretary of Agriculture was the Honorable James Wilson. The President of the United States was William McKinley. The year was 1899, and the work under discussion was the new-fangled Soil Survey.

It wasn't yet called the National Cooperative Soil Survey, and in many ways it was unrecognizable as the sophisticated scientific institution that it is today, but it was from humble beginnings 75 years ago that the Soil Survey grew.

The Survey was largely the brainchild of one man, Professor Milton Whitney, who blended together the concepts of soil analysis and geological survey, and who urged the founding of a national soil survey "from which might be learned the extent and comparative physical and chemical character, climatic relationships, and adaptation to crops of the soils of the United States."

The Early Years

Whitney was the first Chief of the Division of Agricultural Soils. The division was created under the USDA Weather Bureau in 1894, but soon became an independent division within the Department of Agriculture.

On May 3, 1899, with an appropriation of $16,000, Dr. Whitney began field operations of what would become the National Cooperative Soil Survey.

On May 3, 1899, with an appropriation of $16,000, Dr. Whitney began field operations of what would become the National Cooperative Soil Survey. Some 720,000 acres were mapped that year in four separate soil surveys. Surveys of Cecil County, Maryland, and the Connecticut Valley concentrated on two major tobacco-producing areas. In fact, the Connecticut Valley survey had a lot to do with bringing tobacco to the Connecticut Valley. Surveys of the Salt Lake Valley of Utah and the Pecos Valley of New Mexico concentrated on "alkali" soil areas of the West.

The first soil surveyors, as they were called then, included men like Thomas Means, Frank Gardner, Clarence Dorsey, and Jay Bonsteel. They were given elaborately printed and embellished certificates, signed by Secretary Wilson, stipulating that the appointee would be paid the sum of $480 per annum.

Under Whitney's influence, the Soil Survey got off on the right foot from the very beginning, by concentrating on a true soil characteristic—soil texture—as the basis for determining soil types. Whitney believed that soil texture was more important than soil chemistry in plant nutrition although that view was vigorously attacked by other contemporary scientists. The usefulness of soil texture as an important soil characteristic has stood the test of time.

Soil types were the only classification that the early surveys used, and soil surveyors made up types as they went along. Each type name was created from the soil texture plus the area where the soil had been located: for example, Pecos sand or Podunk sandy loam.

Within a few years, the Survey was entangled in soil types, and a new level of soil classification was created, the soil series. The soil series, then, included all soils formed in a given geologic material. By 1906 the Miami soil series, for example, included 16 soils from the glaciated regions, and the Norfolk series included 12 soil types from the coastal plains.

By the same year, several other soil characteristics were also being considered in determining soil series, such as color, organic content, soil structure, drainage, erodibility, and nature of subsoil.

During the early years, soil surveyors often had to develop their own base maps. Geological Survey maps were used whenever possible, but often the soil surveyors would have to make their own maps, working at a scale of 1 inch to the mile.

Field equipment, in addition to the tools of plane-table surveying, included augers, picks, shovels, and—in the West—instruments for determining "alkali." Transportation was by foot, horse, horse-and-buggy, chuckwagon, bicycle, or rowboat.

The hills were full of game in those days. Unfortunately, all too often the game turned out to be the soil surveyors, who found themselves scrapping with bulls, bears, and rattlers. Sometimes the soil surveyors would run afoul of quick-triggered deer hunters or outright desperados. Worse yet, the surveyors might stumble across a still and find themselves surrounded by moonshiners with shotguns.

From the very beginning, soil surveys were meant to be a practical tool. In the early years, the surveys were almost exclusively for farming. To facilitate use of soils data, it was necessary to interpret soils information, and Dr. Whitney made interpretation one of his first goals.

To accomplish this goal, the soil surveyors had to determine the potential of different soils for producing various crops. It would be years before the Bureau succeeded in creating a solid classification of soils, but Whitney began the work from the first days of the Survey.

"The Bureau has never attempted to classify soils according to their current rank as factors in our agricultural output," Whitney said, "but rather to weigh them on the basis of their potentiality, no matter whether they were being used to their full capacity, were lying idle, or were in their virgin state."

The Alabama Agricultural Experiment Station was instrumental in stimulating interpretation. At the station's request, the Bureau made very detailed soil surveys of the experimental farms in Alabama. These surveys provided "laboratory environments" in which to gauge potential productivity of soils. The program was soon to spread to experimental farms in other states.

Some of the early soil surveys raised a storm of controversy.

The hills were full of game in those days. Unfortunately, all too often the game turned out to be the soil surveyors . . .

By and large, though, the soil surveys were greeted enthusiastically, and by the time that Milton Whitney resigned as Chief of the Bureau of Soils, the Bureau had a backlog of requests for soil surveys which would cover more than 750,000 square miles.

The Survey Under Curtis Marbut

In 1913, Dr. Curtis Marbut became the new Chief of the USDA Division of Soils. Marbut had been born in a Missouri log cabin in the middle of the Civil War, but he went on to become a geologist and a renowned professor. At the time he became chief of the Bureau, it was believed that soils were essentially reflections of the geologic formations beneath them. It was Marbut the geologist who ultimately became an "anti-geologist," recognizing that soil science is a true discipline quite distinct from geology.

Marbut was influenced in this view by E. W. Hilgard of California and Cyril G. Hopkins of Illinois, both of whom were bitter opponents of Milton Whitney. But the chief influence on Marbut was the work of the Russian soil scientists, and of Glinka in particular.

In 1916 Marbut, in accordance with the Russian methodology, argued for a much more thorough characterization of soils in terms of the horizons of the soil profile. This put Marbut squarely in opposition to the earlier classification of soils promulgated by the Bureau (and ironically, fashioned in large part by Professor of Geology Marbut himself a few years earlier).

This declaration put the Soil Survey on the right track, but there still was no comprehensive system of soil classification on which to base the soil surveys. In 1920, Marbut began to formulate such a classification.

During those years, another tremendous development took place in the Soil Survey in soil mapping. The National Cooperative Soil Survey has always been a cooperative survey in every sense of the word. Land-grant colleges and other cooperating agencies have made important basic contributions to the scope and thrust of the Survey. One of the most important contributions came from the Indiana Agricultural Experiment Station and Thomas W. Bushnell.

Bushnell was convinced that the best solution to the problem of base maps lay in the use of aerial photographs as a base. In 1929 and 1930, the first county soil survey in the United

States made entirely on large scale airphoto base maps was completed for Jennings County, Indiana. Use of airphoto base maps increased both the scale and the accuracy of soil surveys. By 1931, soil surveyors in Michigan were mapping soil slopes by use of the stereoscope—and doubling the daily rate of mapping progress.

At the same time, new techniques in soil interpretation were gradually developed. These technical changes would eventually result in greatly increased usefulness of the surveys.

Curtis Marbut, working largely on his own, continued to define and redefine a broad classification system for soils. His third and final system consisted of six categories: soil type, soil series, soil family, great soil group, a fifth category based on physical and mineralogical composition of the parent material, and a sixth category consisting of the two classes "pedalfers" and "pedocals," which were differentiated by the horizon of lime accumulation. This final Marbut classification was published in 1935. Marbut died that same year in Manchuria, leaving the Soil Survey a solid framework within which to work.

The Modern National Cooperative Soil Survey

Under Dr. Charles E. Kellogg, who succeeded Dr. Marbut as chief, the National Cooperative Soil Survey continued in a modern world, with a solid framework of soil classification and a firm mapping base in aerial photographs.

Specific systems of soil survey interpretations were developed for the various uses that the soil survey might be put. Perhaps the most important

By 1931, soil surveyors in Michigan were mapping soil slopes by use of the stereoscope—and doubling the daily rate of mapping progress.

specific system involved the development of yield estimates of particular crops on particular soils under a high level of management.

With strong support from the scientific community, the National Cooperative Soil Survey won increasing recognition from Congress. By 1950, the federal appropriation for the Survey was about $1 million, with state appropriations adding yet another $750,000.

The Soil Survey deserves much of the credit for generating the Soil Erosion Service, the present SCS. The Soil Survey was instrumental in the operation and management of 10 soil erosion experiment stations which were set up in 1929. Later, many of the men who had worked for the Soil Survey stimulated the creation of the Soil Erosion Service (SES). Chief among these was Dr. Hugh Hammond Bennett, who came from the Soil Survey to head the SES and the Soil Conservation Service.

Perhaps as a result of this close association, the early leaders of SCS recognized the importance of determining land capabilities. SCS instituted a soil conservation survey of its own that was interpreted in terms of the eight land capability classes.

Since the SCS focus was on soil conservation, the two surveys were complementary rather than interchangeable. The parallel survey in SCS expanded the Soil Survey horizon, but it also meant a possible duplication of effort, where both SCS and the Soil Survey would go over the same ground.

This parallel effort was resolved in 1952, when the USDA division handling the soil survey was put under the Soil Conservation Service, and Dr. Kellogg became the first Deputy Administrator of SCS for Soil Survey.

The trend toward more varied use of the soil surveys has continued down to the present. Today soil surveys contain new interpretation for a variety of uses, such as septic tank absorption fields, sanitary landfills, residential developments, and recreation.

In the future, soils information will be widely available through a computerized soil data storage and retrieval system. A few isolated cases of automatic data processing of soils information existed in the early 1960's, but in the period since 1968, computers are beginning to play an increasingly important role in the National Cooperative Soil Survey. Computers are keeping track of the approximately 11,000 soil series and a data bank containing interpretations of all soil series is growing rapidly at Iowa State University.

Both soil classification and cartographic techniques have become more sophisticated in recent years.

A new soil taxonomy, in large part developed under Dr. Guy Smith's leadership, replaces the 1935 classification system of Kellogg, Baldwin, and Thorp (after Marbut). The new taxonomy uses soil morphological criteria — characteristics that you can see and measure, rather than soil genesis alone. In addition, the new taxonomy is quantitative, making identification a question of precise scientific measurement.

The cartographic work of the Soil Survey has been improved

not only by more sophisticated photographic equipment and the use of high-altitude photography, but also by computers. The MIADS system is a computer program which is used to produce maps on a standard computer printout showing the suitability or limitations of the soils of a particular "cell," usually a 40-acre square, for a specific use. The Advanced Mapping System (AMS) program is a computer-driven automatic mapping program which will be polygonal rather than cellular—that is, the maps it produces will have lines rather than series of computer symbols.

In the future, soils information will be widely available through a computerized soil data storage and retrieval system.

Field equipment has become more sophisticated as well. Modern soil scientists now often use mechanical probes that are mounted on their trucks. Field laboratory kits have been developed which allow soil scientists to run soil determining tests in the woods and meadows, with accuracy close to that obtainable in a research laboratory. Still, much of the field work has changed little from those first surveys of 1899. A good deal of walking is still done and many observations of the subsoil are being made with spade and auger.

The National Cooperative Soil Survey is 75 years old. In those 75 years, the Soil Survey has mapped about one and a quarter billion acres—in detailed soil surveys, reconnaissance soil surveys, and, in Alaska, exploratory soil surveys. That's 55 percent of the United States. A good 75 year's work.

The future? It looks scientific, solid, computerized, technical, professional, and promising. ♦



Soviet Soil Scientists Visit SCS

Members of the U.S.S.R. exchange delegation on soils research visited the Soil Conservation Service in Washington, D.C., in October for background information on organization and programs of the Service. Among topics covered were soil surveys, small watershed projects, water resource activities, and field services programs, including conservation technical assistance, plant materials centers, water supply forecasting, and international assistance. The exchange delegation, part of the U.S.-U.S.S.R. Scientific and Technical Cooperation Program, is discussing cooperative research with U.S. scientists on the theme "Water, Gas, Salt, and Heat Transfer in Soils and Utilization of Saline Soils." ♦

Nonfederal Sources Contribute $4.6 Million for Soil Surveys in 1972-73

Contributions to soil survey work from nonfederal sources totaled $4,666,000 in fiscal 1973, with 15 states each providing more than $100,000 in funds and services.

Contributions in funds and services from Ohio—at $617,000—exceeded all other states. Contributions from Iowa were next at $364,000.

In addition, five states contributed more than $200,000 each — Indiana, New York, Pennsylvania, Virginia, and Wisconsin.

Eight additional states contributed more than $100,000 each in funds and services—California, Illinois, Maine, Michigan, Minnesota, North Dakota, Oregon, and Texas.

These contributions include manpower, equipment, and office space, as well as cash reimbursements. For fiscal year 1974, reimbursements alone from nonfederal sources for soil surveys totaled $2.2 million, including $296,000 from Florida, $287,000 from Iowa, and $229,000 from Indiana.

In addition, contributions under trust fund agreements for soil surveys totaled more than $78,000, provided by Texas ($53,000), Washington ($15,000), and Illinois ($10,000). ♦

In Oklahoma

Soil Survey and Tax Assessment

by Earl C. Nance
Soil scientist, SCS, Stillwater, Oklahoma

Tax assessment based on the potential productivity of the soil is gaining the attention of tax assessors in Oklahoma.

Assessors in 41 out of 77 counties are using SCS soil survey data to appraise land by soil properties rather than by levels of management . . . thus not penalizing a farmer for good management.

"The soil survey can be used as an aid in arriving at an equal evaluation for agricultural land," states John Anderson, who has the responsibility for reevaluating all real estate, including agricultural land, for tax purposes in Payne County, Oklahoma.

The procedure, basically, is to assign ratings to the soils based on productivity. The ratings in Oklahoma are based on the soil being used to its fullest agricultural capacity.

Once ratings have been assigned, many tax assessors place a dollar value on each of the ratings. By using the soil survey on aerial photographs and using an acreage measuring device, the assessor can record the acreage of each soil on a given farm and multiply it by its per acre value. Adding these together gives the agricultural value of the land.

Ratings for each of the soils in Oklahoma were assigned after the average annual production of crops, grasses, and trees had been determined for all soils in the state.

These ratings range from 5 to 100. Soils with a capacity for high yields for many agricultural plants are assigned a high rating; those with low yields and adapted to few agricultural plants have a low rating.

Soils suited for growing cultivated crops are rated from 40 to 100. Those best suited for pasture grasses are rated from 35 to 60. Soils suited only for range or forest are rated between 10 and 35. Miscellaneous land types such as oil-waste are normally given a rating of 5.

As an illustration, some soils of the Panhandle of Oklahoma are on broad, level areas with an annual average rainfall of 18 inches. For dryland farming these soils are best adapted to growing wheat and grain sorghum. But with this limited crop adaptation, and restricted yields due to limited rainfall, a rating of 60 is assigned. Soils with similar physical properties but with wide crop adaptation and potential yields in the 45-inch rainfall area of southeast Oklahoma are given a rating of 100. The same procedure is used for pastureland and rangeland.

Most soils in Oklahoma that are best suited for growing pasture grasses range from 3 to 9 animal unit months (AUM) of productivity per acre, per year. Those with the fewest animal unit months of productivity are given the lowest rating. Similarly, for rangeland—basically native grasses, normal production is from 500 to 7,000 pounds per acre, dry weight, and the lowest production receives the lowest rating.

Ratings for soils best suited for forest are also based on potential productivity, but are just the opposite of other agricultural ratings. In Oklahoma, woodland is rated 1 to 5 with the lowest productivity at 5. Thus, in the case of forests, the highest rating goes to woodland rating 1.

To achieve consistency throughout the state, all soils are assigned an index rating. Then as tax assessors use the ratings in their evaluations of agricultural land, they can modify the system to fit local conditions. For instance, farmland near a town would be assessed differently than land further out.

With about 93 percent of the land in Oklahoma having a completed soil survey, tax assessors are becoming more knowledgeable of soils and their potential productivity—and the role the survey can play in reevaluating land for tax purposes. ♦

Here's a sample of how a tax assessor might set up a productivity rating for soils in his county, using the highest level of management, as is done in Oklahoma. The most productive soil in the county would be rated 100, the least productive would be rated 5, and the other soils would be rated in between.

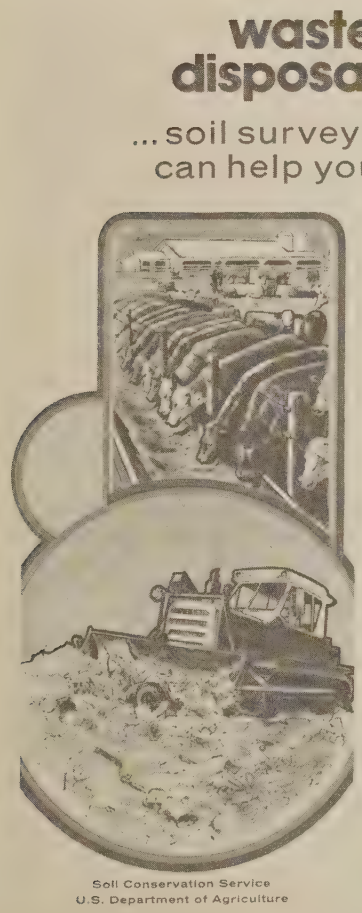
	Wheat		Grain sorghum		
Kind of Soil	Average bu./acre	Productivity rating	Average bu./acre	Productivity rating	Soil rating
Soil 1	40	40	60	40	80
Soil 2	30	30	40	27	57
Soil 3	20	20	33	22	42

New Brochures Answer Questions on Soil Surveys

"Hello, Soil Conservation Service? Hi, I'm calling from the Jones Development Corporation and we're investigating sites for a second-home development along Lake Winnebago. How can soil surveys help us choose the best site and what development hazards are revealed in the surveys?"

"Hello, Soil Conservation Service? This is Robert Hill from the Public Works Department. We're trying to locate a new site for a sanitary landfill, and wondered whether the county's soil survey has interpretations for waste disposal."

"Hello, Soil Conservation Service? I'm a farmer up north of Bagley and I'd like to try raising that new crop, wild rice. But I just don't know whether I could raise wild rice on my soil. Does that soil survey have anything in it that'd tell me what I need to know?"



Every field office of SCS has requests like these. Land use planners, land appraisers, construction engineers, ranchers, homebuyers, and many others call or write asking how soil surveys can help them.

A new series of USDA publications will help answer the questions for many different soil survey users and many common soil survey uses.

Of the nine new brochures, one, entitled "Soil Surveys Can Help You" (PA-1054), is a general look at some of the many ways soil surveys are used. Each of the other eight brochures is directed at a particular problem that different people face when referring to a soil survey:

"Farmers and Ranchers . . . Soil Surveys Can Help You" (PA-1047) tells farmers how to use a soil survey to plan conservation practices, to find out what crops will grow best on their soil, and to estimate yields. Ranchers can use a soil survey to determine range potential, to estimate the likely benefits of various range management or grazing management practices, and to decide which range areas to use for pasture or for hay.

"Appraising Farmland . . . Soil Surveys Can Help You" (PA-1052) tells bankers, tax assessors, and others interested in evaluating farmland how to use soil maps and yield estimates by soil type to develop productivity ratings for farms to reflect the potential productivity of the soil, rather than the quality of present farming management.



"Developers and Builders . . . Soil Surveys Can Help You" (PA-1049) tells how to plan better projects and avoid cost overruns by anticipating soil hazards such as seasonal or occasional flooding, wetness, erodibility, poor bearing capacity, and slippage.

"Construction Engineers . . . Soil Surveys Can Help You" (PA-1048) explains how soil surveys can reveal properties which would require special structural measures to overcome or special maintenance once construction is completed.

(continued on p. 11)

Soil Survey Helps Protect Water Supply

by Bryce W. McEwen
Soil scientist, SCS, Auburn, Maine

Landmark legislation, a court order, and a soil survey have added up to the protection of a community's water supply around Sebago Lake in Maine.

The problem started several years ago when Frye Island in Sebago Lake was sold to a land development company which subdivided the island's 900 acres into 1,400-lots.

The pine-covered island, which had long been a boys' summer camp, was in a township which had no standards or plans regulating development . . . and no public sewage system. Frye Island was dependent on septic tanks to dispose of human waste.

Just what effect the development would have on the quality of Sebago Lake was of vital importance to the Portland Water District, where 155,000 people in 14 towns and cities depend on the lake for their water supply.

Thus, the Portland Water District and the State of Maine filed legal action for a court order to stop development of the island until adequate plans and soils information were available to insure a safe public water supply in Sebago Lake.

They were able to do this through landmark legislation on site location and minimum lot size in Maine. The law establishes standards and procedures for land development involving lots of more than 20 acres or 60,000 square feet of buildings. It applies to any individual or corporation intending to build or operate a development which will "substantially" affect the local environment. One of the requirements for development is that it must be built on soils suitable for the proposed land use.



Following a soil survey of Frye Island, eight soil suitability maps were prepared for use in planning development of the island.

The state has a Soil Suitability Guide for Land Use Planning, developed by the Soil Conservation Service in cooperation with the Maine Soil and Water Conservation Commission, the Maine Agricultural Experiment Station, and other state agencies and groups.

Developed in 1967 and revised in 1969, the guide is the basis for judging the suitability of soils for many uses and is the document used by state agencies to determine soil suitability. Identification of soils in the guide is by soil survey mapping units.

The Portland Water District, through the Cumberland Soil and Water Conservation District, then requested the Soil Conservation Service to make a soil survey of Frye Island.

A medium intensity soil survey was made at a scale of 1:15,840 and a set of eight soil suitability maps were prepared for use in planning development of the island.

With these soils data and the state requirements for site location and lot size, a court order was issued that allowed the developer to continue planning development on suitable soils.

The developer is required to submit plans and request construction permits for develop-

ing a number of lots each year. A private consultant soil scientist is required to make an onsite soils investigation of each proposed lot to determine the suitability of soils on that site for septic tank sewage disposal and for the proposed building.

This information and the developers' plan are reviewed by the Portland Water District and the Maine Department of Health and Welfare. If these agencies approve the plan, then a building permit is issued.

Over a period of 3 years, 51 building lots were investigated on Frye Island and 18 of these were determined to be unsuitable.

Three lots, developed before the onsite soil suitability procedure, have experienced soil-related problems. On one, a building was moved to a new, suitable site and on the other two, the lot size was increased to provide soil suitable for septic tank sewage disposal.

Estimates, developed through the use of the soil survey, are that Frye Island can carry about one-half of the cottages and buildings originally planned without degrading the quality of the environment and the water in Sebago Lake.

To date, there has been no detectable adverse effect on



Development continues on Frye Island on suitable sites. A private consultant soil scientist makes onsite soils investigations of each proposed lot to determine the soil suitability for septic tanks. This helps protect surrounding Sebago Lake, which provides water for 155,000 people in the Portland Water District.

Sebago Lake. The island is now being planned and developed by the company with strict adherence to soil suitability, erosion control, and waste disposal. ♦

New Brochures...

(continued from p. 9)

If, unfortunately, neither the developer nor the construction engineer on a housing project has checked a soil survey, "Homebuyers . . . Soil Surveys Can Help You" (PA-1050) tips consumers off to what to look for in a soil survey before investing in a new home.

Sanitarians and public health officials reading "Waste Disposal . . . Soil Surveys Can Help You" (PA-1051) will learn how soil surveys can help solve waste disposal problems—from small feedlot lagoons to full-sized sanitary landfills.

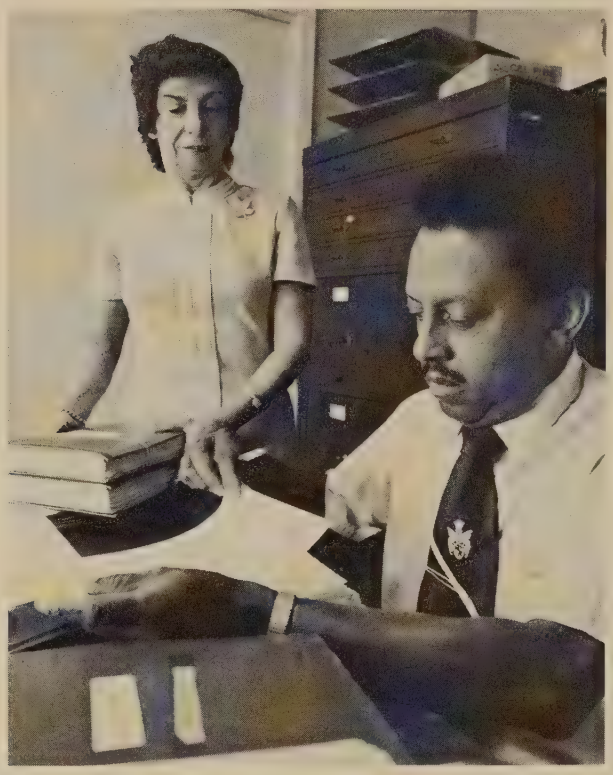
"Recreation Planners . . . Soil Surveys Can Help You" (PA-1053) explains why soil data are needed in selecting and maintaining recreation sites, including woodlands and wildlife areas.

"Land Use Planners . . . Soil Surveys Can Help You" (PA-1055) explains how published soil surveys can help planners determine the suitability and limitations of soils in given areas for houses and commercial buildings, septic tank absorption fields, roads and highways, recreation areas, and other land uses.

The new series of brochures offers basic advice on how to use the soil survey; the survey itself naturally remains the real tool in solving problems. All nine brochures are illustrated with colorful examples of the land uses involved.

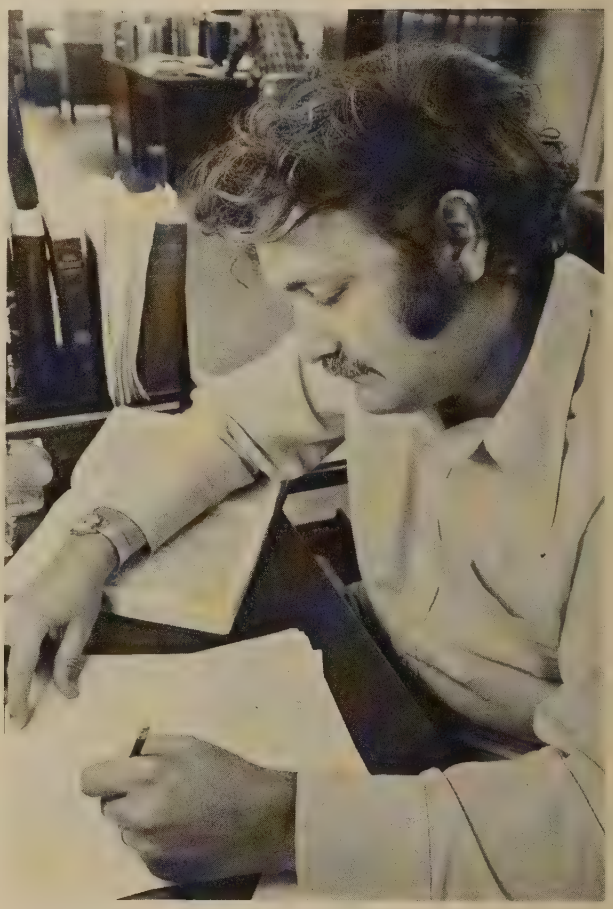
Single copies of the various brochures are available from local SCS offices. Additional copies are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, at 25 cents a copy. ♦

The (Soil Survey) Buck Stops Here



Demand is up for published soil surveys. Last stop for the survey manuscripts before going to the printer is an SCS editorial office near Washington, D.C., where new technology is helping speed a job that has proved too time-consuming in the past. Output already has doubled; it may triple by 1976.

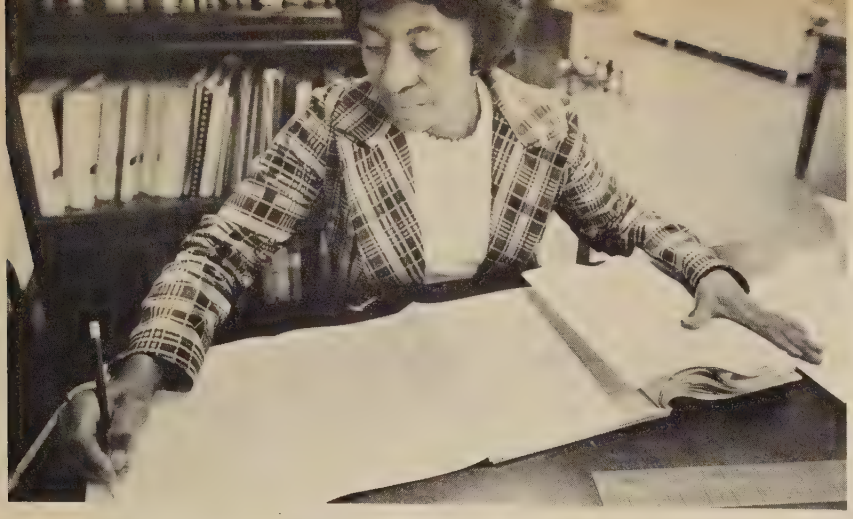
Mary E. Austin presents soil scientist William L. Shelton with a new batch of book-length survey manuscripts from the field. Shelton reviews them for technical soundness; if they measure up, they are turned over to the editing shop.



Head of the soil survey editorial staff is William A. Hamilton (below), who checks the publication schedule to determine which editing jobs receive priority. Scheduling is done by a top-level committee of soil scientists and cartographers.



If it appears on the current schedule, the manuscript may be assigned to a "house" editor, like Stan Anderson (above). Manuscripts vary widely in quality; those requiring the heaviest editing are handled by SCS employees.

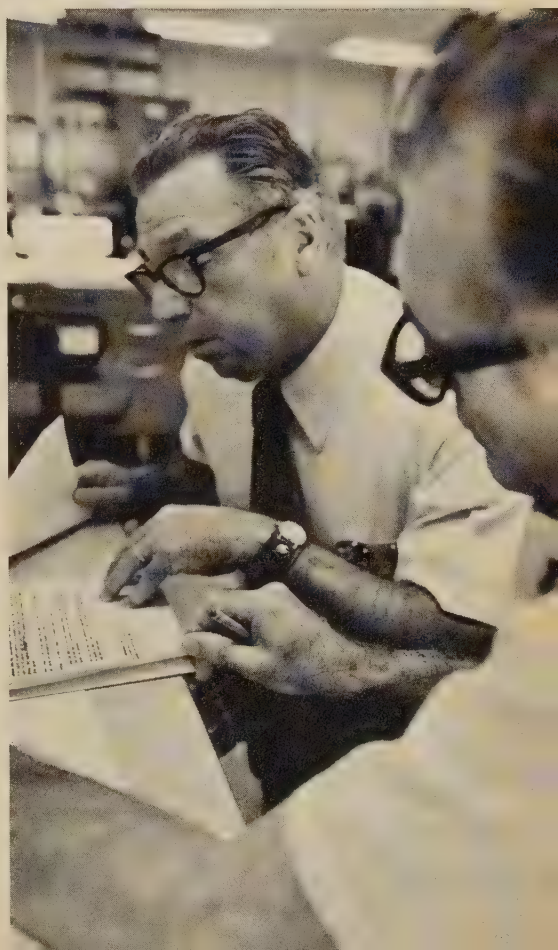


Editing of other survey manuscripts is contracted to commercial editing firms, but their work is reviewed carefully by SCS senior editors like Marian Smith. Contracting enabled the SCS unit to increase output from 42 surveys edited during fiscal year 1970 to 85 in 1974.



Latest innovation is an editing system using word-processing equipment, prewritten text, and computerized tables. At left, editor Steve Folan shows operator Peggy Sampson how to correct a line of copy on the screen. The corrected manuscript is stored on a tape cassette, which eventually will be used to drive an automatic typesetting machine at the Government Printing Office.

Chief editor Hamilton (below, at right) coordinates scheduling with Cartographic's Bob Wray, head of the map printing section at Hyattsville, Maryland. Aim is to get the printed maps as the edited manuscript is set in type so that both can arrive at the bindery at about the same time. The editing system should enable SCS editors and clerks to increase manuscript output still more. It will eliminate many retypings of corrected pages and much of the laborious and time-consuming proofreading.









Film of aerial photographs comes to the Cartographic Division from contractors all over the nation.

Above, Luther Mayo checks each aerial "run" for compliance to specification.



The photographs are then corrected for scale and annotated to produce photobase map sheets for the soil survey area. Checking completed sheets at left is Leo Ausilio.

Completed maps are then printed for binding into the published survey. Cartographic Division prints some 30 percent of the maps produced each year; the remaining 70 percent are contracted to commercial printing companies.



Field Kit Provides On-the-Spot Solutions

by C. M. Thompson, C. L. Girdner, and George Holmgren
State soil specialist, SCS, Nacogdoches, Texas; state soil specialist, SCS, Austin, Texas; and soil scientist, SCS, TSC, Lincoln, Nebraska

A new soil survey field kit is helping soil scientists speed up field work, improve mapping accuracy, and provide on-the-spot solutions to problems of soil taxonomy.

It is particularly timely, since USDA's new *Soil Taxonomy* requires that soil scientists evaluate many different soil properties to classify soils accurately. Many of these properties can be seen, felt, or otherwise identified by simple field techniques. Others require laboratory analysis for accurate determination. Conventional analysis is complex, time consuming, and expensive.

However, if the field soil scientist is to move the soil survey at a rapid rate and have confidence in his decisions, he needs specific and timely knowledge of soil properties. The new soil analysis kit is designed to meet this need for rapid, on-site analysis.



The soil survey field kit enables the soil scientist to set up a laboratory on his truck bed.

The field kit permits determination of over 20 soil properties, including cation exchange capacity, exchangeable bases, acidity, base saturation, soluble salts, calcium carbonate, and gypsum. It was developed by the Soil Survey Investigations Unit of the Soil Conservation Service in cooperation with the Hach Chemical Company of Ames, Iowa. Many of the procedures are unique and new. Others were adapted from existing procedures, particularly those developed by the U.S. Salinity Laboratory.

One place where the kit has been particularly effective is in the East Texas Timberlands. In the complex landscapes of the Gulf Coastal Plain many soils look alike but have significantly different chemical properties.

For example, soils developed on convex surfaces of the Queen City geologic formation have a base saturation ranging from 40 to 55 percent, while closely associated and similar soils developed on the Sparta formation have a base saturation of less than 30 percent. The break between Alfisols and Ultisols Order in soil classification is 35 percent base saturation. This means that these visually similar soils are in different soil orders which reflect some differences in soil be-

havior. Without the benefit of on-the-spot chemical analysis, it would be extremely difficult to obtain a good, accurate soil map in this area. With the help of the kit, it has been possible to discover physiographic and vegetative correlations among the different soils so that it is possible to map these soils with much greater confidence.

The kit has also been helpful in the Texas Gulf Coast Prairie and in the irrigated areas of the Rio Grande Plain where salinity and sodium are problems.

Salinity reduces crop growth and sodium tends to disperse the soil if present in amounts greater than 15 percent of the exchange capacity. With the kit, soil scientists can make on-site evaluations of these soil properties to assist in predictions of soil behavior.

Soil Taxonomy also makes use of the "natric horizon" in defining soil classes. This natric horizon is a clay-enriched horizon that contains more than 15 percent sodium. With the kit, it is possible to determine this important soil property without sending soil samples to the laboratory.

The rapid procedure for determining calcium carbonate has also been very useful. Soils with more than 40 percent calcium carbonate equivalent are grouped separately in *Soil Taxonomy*. These carbonatic soils are droughty because of a lowered water-holding capacity. Crops such as grain sorghum and small grains often exhibit chlorosis (yellowing) when grown on soils high in calcium carbonate. Some highly calcareous soil materials are stable and therefore desirable for construction purposes, depending on the particular purpose.

Use of the field kit to determine soil characteristics has saved much time and money and has, in addition, enabled the field soil scientists to answer many questions about soil properties.

This has freed the Soil Survey Investigations Unit staff for the more complex analysis involved in complete soil characterization studies. Soil classification and correlation work has therefore been made more efficient and accurate.

With the kit, data are accumulated quickly, on-site, and in relation to specific requirements. The field soil scientist is therefore able to develop a broader understanding of soil properties and how these properties affect soil behavior.

As a result, better soil surveys are being made to meet the needs of land use planners, engineers, plant scientists, and ecologists. ♦

Dr. Kellogg Named Honorary Member Of International Society of Soil Science

Dr. Charles E. Kellogg, the Federal Government's top soil scientist for 37 years before his retirement from USDA in 1971, has received the top international honor for a soil scientist–honorary membership in the International Society of Soil Science.

Victor A. Kovda, president of the Society, honored Dr. Kellogg for his contributions to international soil science and to the Society at its 10th International Congress last August in Moscow.

Honorary membership in the society is limited to 15 scientists, although there have never been more than 10 honorary members at any one time.

Dr. Kellogg first headed the USDA Soil Survey in 1934 at the age of 31. In 1952, the work was transferred to the Soil Conservation Service and Dr. Kellogg was named Deputy Administrator for Soil Survey, the position he held at the time of his retirement. He received the Department's Distinguished Service Award in 1950.

He served as secretary on the Committee for Agriculture during the organizing conference of the United Nations Food and Agriculture Organization in Quebec in 1945, and subsequently worked closely with FAO and UNESCO on many conferences and projects. In addition, Dr. Kellogg has worked with agriculture ministers and scientists in many countries, including the Soviet Union, Australia, Israel, Vietnam, Ghana, and India.



DR. KELLOGG

Born on a farm near Ionia, Michigan, Dr. Kellogg received his B.S. and Ph.D. degrees in soil science from Michigan State University. He now lives in Hyattsville, Maryland. ♦

A New Role for Connecticut Soil Scientists

by David Lavine and Edward H. Sautter
Director, Connecticut Inland Wetlands Project, Middletown, Connecticut, and state soil scientist, SCS, Storrs, Connecticut

On the edge of a Connecticut field, a soil scientist explains to members of a local inland wetlands agency about the soils on which they are walking, where the poorly drained soils merge with moderately well-drained soils.

The members have the task of regulating wetland activities, and as they begin to get their feet muddy, the data they've received earlier starts to fall into place.

Such on-site trips are part of a program set up by the eight soil and water conservation districts in Connecticut to help local inland wetland agency members learn about soils and how they are classified.

What makes a soil scientist and the soil survey so important is Connecticut's Inland Wetlands and Watercourses Act, passed in 1972.

This act requires a local agency—or the state if no local agency is established—to regulate and license nearly all activities on waterbodies and wetlands in the 169 towns in the state. Anyone who wants to remove or deposit materials on a wetland or watercourse must seek a license.

The act defines wetlands as being all soil types designated as "poorly drained, very poorly drained, alluvial and flood plain by the National Cooperative Soil Survey . . ."

This legislative definition of wetlands includes soils which comprise more than half a million acres in Connecticut—about 1 out of every 5 acres in the state.

Frequently, the local inland wetlands agency members have had little or no experience in recognizing or knowing the limitations of wetland soils. That's why the soil and water conservation districts have set up educational programs for these agencies.

In Middlesex County Soil and Water Conservation District, for example, SCS Soil Scientist Dennis Hutchison and District Conservationist Barry Cavanna usually start a group off with some background on soils, followed by an examination of the soil survey maps and how they are made.

However, for the agency members, it is the actual on-site look at wetland soils which brings all the pertinent information together.

Prior to the enactment of the Connecticut legislation, substantial thought was given to soils as the basis for the definition of wetlands. It was determined that the long experience of the Soil Conservation Service in delineating boundaries between soils would simplify the task of determining wetland and nonwetland areas.

Two years of experience with the act have confirmed this judgment, although refinement of wetland boundaries continues.

To assist local inland wetlands agencies, soil and water conservation districts in the state have been entering into Memorandums of Understanding. They provide substantial guidance and technical aid to the agencies in drawing boundaries and determining the limitations of wetland areas where permits have been requested.

While much remains to be done—such as more precise boundary delineation—the first steps have been successfully taken. The soil survey is proving to be an extremely valuable planning tool. ♦

A soil scientist surveys a marsh area in Connecticut.



An ERTS-Based Land Resource Inventory For Mexico's National Water Study

by A. A. Klingebiel and Victor I. Myers

A national water study currently underway in Mexico under the direction of that government's Ministry of Hydraulic Resources grew out of a World Bank Mission Economic Study that concluded:

Long-term economic growth of Mexico would be limited more by the constraint of water than by the lack of any other economic resource.

As the study that began in 1972 progressed with design, guidance, and monitoring assistance from the World Bank, the leaders recognized the need for technical expertise in soil resource evaluation and remote sensing procedures. That's how we were drawn into the picture (Kling fresh from 4 months of retirement; and Vic from his directorship of the Remote Sensing Institute of South Dakota State).

Our assignment was to pioneer in the development of a plan and procedure for the preparation of a potential land use map of Mexico. Our map would be based on interpretation of available soil and related resource data and on the use of Earth Resources Technology Satellite (ERTS) imagery. (For background on ERTS imagery, see p. 12, September 1974 issue, SOIL CONSERVATION.)

We felt that a key item the Mexican government needed from the National Water Study was the location of the greatest potentials for use of water in the production of food and fiber. If officials were to place priorities on water development projects and on water use, they would need to know where benefits probably would be greatest. The efficiency of the present soil and water uses, as well as development of new sources, would need evaluation.

Out of our study emerged soil maps and interpretations that are intended to give the "big picture" of the location and extent of the potential soil resources of Mexico. They offer a guide to the Mexican Government for more detailed studies of those areas that we have determined to have "good" or "fair" potential for development. If specific improvements are planned, such as drainage or irrigation, officials will need more detailed soil studies. The potential land use maps focus on those areas that will provide the greatest benefits for efforts expended. The maps also provide basic information needed for the improvement and adjustment of present farming practices and kinds of crops grown. For example, the maps can be used to show that some areas now used for rice production could be used for other crops, and rice production could be shifted to the more humid Gulf Coast where water is ample and the soils are more suitable for rice.

We reviewed available resources data but concluded that they could not be projected safely to the entire country. Because time ruled out a detailed study of the nation's basic resources, we decided to place available resource data on a reliable map base for easy reference and use. Our first task was to develop a plan to synthesize the resource data available and to develop a pro-

About the Authors . . .

Two former SCSers recently provided guidance to the Mexican Government in a pioneering effort to combine soil resource evaluation and remote sensing procedures to carry out that nation's national water study.

They were: Albert A. Klingebiel, who retired in 1973 as head of the Soils Interpretation Division of the Soil Survey after 36 years of experiences that soil scientists commonly have with bulls, snakes, dogs, swamps, mosquitos, and all the rest; and

Victor I. Myers, currently director of the Remote Sensing Institute, South Dakota State University. Myers spent several years as an SCS irrigation and drainage engineer. Before coming to Brookings, South Dakota, he transferred to ARS in Weslaco, Texas, where he carried out some of the first photo-interpretation work from the ERTS imagery.

cedure that could be used as a basis for the soil resource portion of the water study.

Different base maps had been used in the original preparation of various resource maps. For that reason, we had to reevaluate and adjust some of the boundaries to fit the "true landscape" as shown by imagery obtained from the ERTS. We used the ERTS imagery as the base for our maps. This satellite orbits the earth 14 times per day and each pass covers a strip 185km (115 miles) wide. Sensing devices on the satellite record data in four bands, green, red, near infrared, and a second infrared.

We used three bands. The green band (band 4) provides useful information about crops. Soils generally have greatest reflectance contrasts in the red band (band 5).

Vegetation has very high reflectance in the near infrared band (band 7), making it possible to detect different types and conditions of vegetation. For our purposes, the second infrared band (band 6) was not needed. In these studies vegetation, in many cases, is an indicator of different soil conditions. Moisture strongly absorbs infrared energy, making it especially easy to differentiate moist soils and water areas from the more shallow or dry soil areas. Images obtained when plants on shallow or droughty soils are showing moisture stress will be quite different from those on the same soil when it is wet, or from other soils that are wet. Different kinds of vegetation and major differences in terrain also give different reflectance patterns as well as numerous other soil and landscape features.

The Mexican Government had purchased two sets of composite color transparencies (bands 4, 5, 7) at 1:1,000,000 scale for most of the country. One set represented the wet season (October, November) and one set the dry season (February, March). We used these transparencies at 1:1,000,000 scale as the base for our maps. For field work, we used prints made from these transparencies at a scale of 1:500,000. We also used a complete set of ERTS transparencies of band 5 taken during the dry season; band 5 provides information on soils and landscape that may not be apparent on the composites.

In consultation with the Mexican Water Study Group (PNH), we developed a plan to use existing resource data and the interpretation of ERTS imagery to prepare potential land use maps.

We first had overlays made at a scale of 1:1,000,000 from each of the following resource maps: geology, soils (FAO classification), topography (slope groups prepared from available topographic maps by PNH staff), rainfall, present land use (interpreted from ERTS imagery), and cultural features (cities, roads, and other important features). These overlays, which were prepared for each ERTS image, were indexed so that they fit in the proper position when placed over the ERTS transparency of the same scale.

We then tabulated important soil properties and basic soil interpretations, such as yields of important crops and livestock carrying capacity, for each of the principal soils shown on the soil map of the area. These data are useful in relating kinds of soil and soil properties to specific areas that may look quite different on the ERTS image.

Next, photo-interpretation keys were prepared to develop basic resource data and to help interpret differences on the images. Thousands of color tones appear on composite color images (bands 4, 5, and 7). We had to relate color tones, characteristics, and geometric patterns to specific, consistent differences on the ground. Landform, vegetation, drainage patterns, geology, and soil color were used to relate the differences on the images.

Finally, all materials prepared and information collected were studied, and resource data were

Ground checks by soil scientists are essential to identify positively the differences observed from ERTS images and from the aerial survey.



evaluated and related to differences on the ERTS images. The first draft of the potential land use map was completed. Each different delineation on the map was given a symbol and the FAO components within the unit were identified and described. Now we were ready to go to the field for aerial reconnaissance and ground checks. We studied two pilot areas. One was near Zacatecas in the more arid part of north central Mexico and the other was in the more humid lower Gulf Coast near Veracruz.

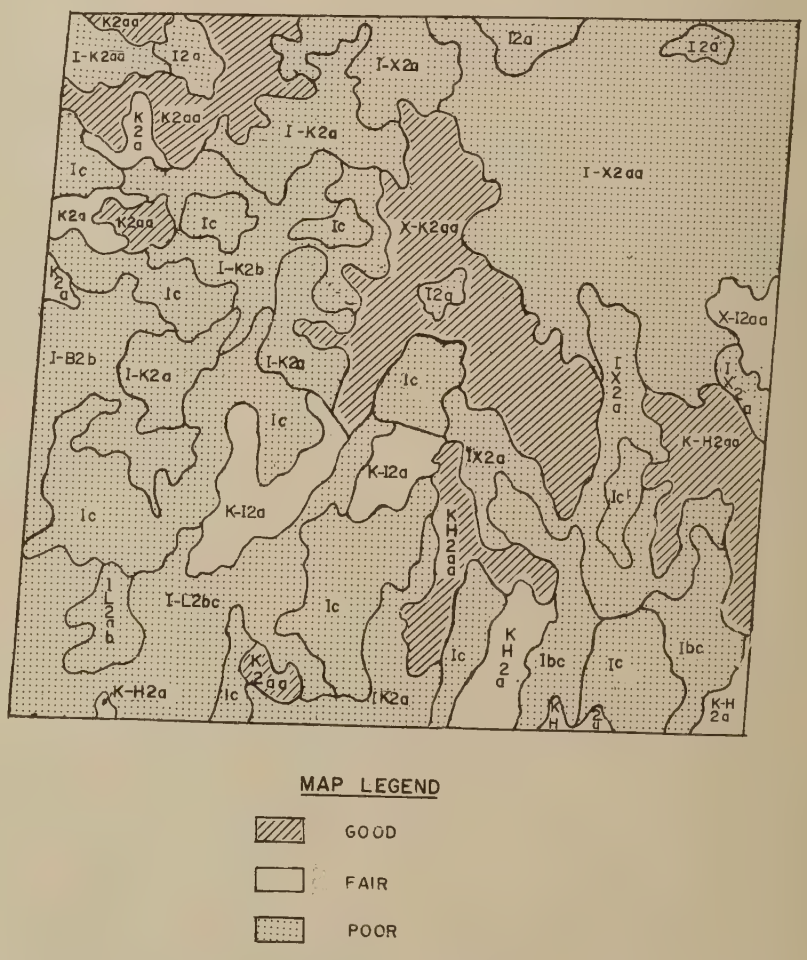
We flew over the areas at about 3,000 feet. Reconnaissance required about 3 hours per ERTS image. The potential land use map on a clear overlay was placed over a print of the color ERTS image. We had a "bird's eye" view of the area and could evaluate the new map by aerial observation and comparison with the image. Notes taken in flight were keyed directly to specific areas on the color print. We also took pictures (35mm) to show the relation of the landscape to features on the image.

Ground checks also were essential to identify differences on the image. We spent several days traversing each area, dug holes to describe and classify soils, observed vegetation, terrain, and other features related to use and management of the soils. We attributed differences on the image to soils, slope, kinds and densities of vegetation, and some were unexplained. We visited agricultural experiment stations so that we could relate crop yields and other data to soils in the area.

After a week in each pilot area, we were convinced that our procedures had been satisfactory. We then compiled the observations and data from the field and revised the first draft into a final map. Final descriptions of each mapping unit were prepared and soil properties and soil interpretation tables were completed to conform with the final map.

From the final potential land use map, we prepared many interpretive maps. Soil potentials were indicated for cultivated crops, tame pasture and range, erosion hazard, wetness, soil depths, and slope. Areas were evaluated for irrigation, for specific crops, and for other uses. Since the potential land use map is based largely on climate, kinds of soil, and slope, it can be interpreted for many uses. With these maps, the Mexican Government can consider alternatives for use of soils and estimate its total potential for growing food, feed, and fiber. This map will be used to help develop a water policy for Mexico.

We look upon our work as an example of how the experiences we gained in our lifetime have been put to good use for others. And we have satisfaction in feeling that our knowledge adapted to these circumstances can help millions of Mexicans to a better life in years to come. ♦



This basic soils map at a scale of 1:1,000,000 was interpreted to show the potential for cultivated crops and tame pasture in the Zacatecas area of Mexico. The soil symbols on the map identify the kinds of soil (FAO classification), including dominant surface soil texture and slope class.

Computer Codes Montana Soil Data

by Jack W. Rogers and Dr. Gerald A. Nielsen
State soil scientist, SCS, Bozeman, Montana, and professor of soil science, Montana State University, Bozeman, Montana

A field soil survey program using automatic data processing in McCone County, Montana, could serve as a model nationwide.

Dr. Gordon L. Decker, soil scientist with the Soil Conservation Service, has been studying the opportunities of using computers to expedite soil survey programs This work is being carried on in cooperation with Montana State University.

Heretofore, keeping track of the detailed characteristics and capabilities of the more than 700 different kinds of soil in Montana required time-consuming note taking, typing, and bookwork. With the computer system, field scientists can now make a pencil stroke and record facts on a computer form.

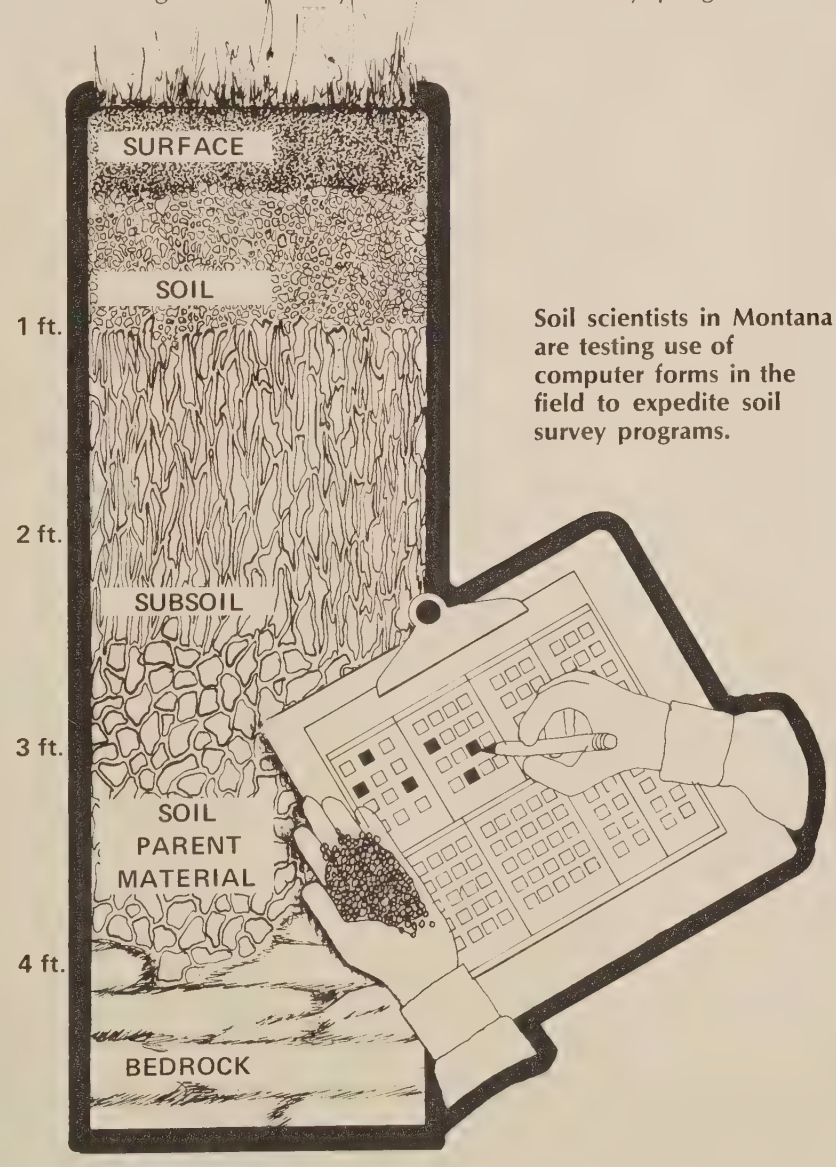
After being marked in the field, the forms are sent to Montana State University where written soil descriptions are produced by the computer and information is stored on computer magnetic tape. A detailed description of a given soil can be retrieved from the computer for a few cents. Little manual typing is ever required.

Information stored in the computer is used later to prepare legends for soil maps and to help classify and rate the suitability of each soil for a variety of agriculture, recreational, wildlife, engineering, and urban uses. This information is eventually made available to the public in soil survey reports. The stored data are also used in research projects at Montana State University.

Computer forms are now being used in soil survey programs throughout Montana, and further testing will determine their worth on a national scale. This is the first operational test of a proposed national system for coding basic soils information for automatic data processing by computers.

Direct input can be made to the National Pedon (Soil) Data Record being developed by the National Cooperative Soil Survey. This data bank will provide easy access to information about soils anywhere in the United States.

Dr. Decker has developed, and is testing, several computer models for predicting the behavior of soils. These models are part of the continuing effort to maximize the efficiency of field soil survey programs. ♦



Soil scientists in Montana are testing use of computer forms in the field to expedite soil survey programs.

Undaunted... They Did Their Own Inventory

by Jonathan P. Edwards
Soil scientist, SCS, Lake Stevens, Washington

In the late 1940's two brothers in eastern Washington faced a bold decision: Should they break or stay with tradition in operating the 840-acre dryland wheat farm they had acquired from their father?

Harvey and Virgil Schneidmiller's farm is on the rolling loess soils in Palouse-Rock Lake Conservation District. Severe erosion by wind and water was depleting the soil, robbing the brothers of future income.

At the time there was no published soil survey for Whitman County—one would have helped greatly in pinpointing problem areas.

Undaunted, the Schneidmillers made their own resource inventory of the entire farm. They inventoried deep bottomlands, hilltops, ridges, and steep-sloped hillsides, and they analyzed the topography to locate drainages, streams, rock outcrops, and slopes.

Following their own inventory, the Schneidmillers, together with Soil Conservation Service technicians, began tackling urgently needed management decisions.

First they selected crops suitable to soils and terrain. They decided bottomlands could be adapted to sprinkler irrigation and intensive management. SCS designed a dam to impound water in a creek.

The brothers launched a bluegrass seed business that prospered. In the uplands, where soils were rolling and dry, the brothers rotated winter wheat and barley.

The deep, dark topsoils, which had the best yields of grain, needed protection from wind and water erosion. The brothers learned that the light colored subsoils that remained after topsoil was eroded were more expensive to farm and brought smaller returns. Subsoils have less organic matter and require more fertilizer to maintain yields. In addition, equipment is more difficult to operate in preparing these clay soils for crops.

To decrease erosion on the steepest slopes, the Schneidmillers took these slopes out of production and seeded them to grass. Some 60 acres were treated this way.

On the remainder of the farm, the Schneidmillers practiced minimum tillage and left

Virgil Schneidmiller (right), who did much of his own soil survey work on his farm back in the late 1940's, talks with Dennis Roe (center), district conservationist for Whitman County, Washington, and Leonard C. Johnson.



the soil more cloddy, keeping a trashy surface and maintaining stubble mulch on the land. The Schneidmillers pioneered in use of a chisel plow rather than a moldboard in the Palouse. On the fragile loess soil, the chisel has a dual function: It throws only a fourth as much soil downhill and helps maintain stubble mulch and trashy surface, both of which resist erosion.

Close observation shows excessive tillage pulverizes the fragile silt loam loess and increases the erosion hazard. The subsequent SCS soil survey indicated the predominant soils had lime and caliche about 40 inches below the surface. Where erosion ultimately exposed these layers, wheat yields were reduced drastically.

When yields drop to fewer than 10 bushels per acre—as they had—the brothers found it was a waste of time and equipment to farm these areas. In addition, caliche fragments would drift downhill and contaminate productive lower slopes. These problem areas were seeded to grass in strips up to 100 feet wide to hold soil in place and divide the slope along its length for runoff control.

The Schneidmillers turned some of the problem areas they found during their inventory into assets. In gullies with severe erosion hazard potential and in those with rock outcrops, the brothers smoothed draw bottoms and planted them to grass. These grassed waterways also served as access roads to all parts of the farm during most seasons. Dams and silt basins built in the draws collected enough soil to cover bedrock and fill in the draw, bringing into production land that was once a nuisance. ♦

Reviews

Elements of Photogrammetry. Paul R. Wolf. *1974. McGraw-Hill Book Company, New York, New York. 562 pp., illus. $18.50.*

This book has been prepared primarily for use as a text for an introductory course in photogrammetry at the college level. It should also be a valuable addition to the libraries of practicing photogrammetrists, cartographers, surveyors, engineers, foresters, geologists, geographers, landscape architects and others who use photographs in their work.

The book provides a modern introduction to the broad and dynamic field of photogrammetry. It includes topics traditionally found in photogrammetry textbooks such as cameras, photographic geometry, stereoscopy, parallax, radial-line triangulation, flight planning, ground control, and stereoscopic plotting instruments. In addition, this book provides introductory coverage on the subjects of orthophotos, terrestrial photos, oblique photos, panoramic photos, photography and photographic processing, photogrammetric optics, control extension by photogrammetric bridging, photographic interpretation, and remote sensing.

The material in this book has been written using elementary terms as much as possible, and extensive use has been made of illustrations and diagrams. Example problems have frequently been included to clarify computational procedures. In view of the impending adoption of the metric system in the United States, metric equivalents are generally given in parentheses following foot and inch values. In order that the book might be suitable for students of varying levels of mathematical competence, the body of the text has been presented so that knowledge of only elementary algebra, geometry, and trigonometry is necessary.

Chapters are arranged in an order found most convenient by the author during many years of teaching photogrammetry at the Universities of California and Wisconsin. Early chapters establish fundamental principles, while later chapters discuss the more specialized aspects of photogrammetry with emphasis on practical applications. In general each chapter is arranged so that the more important material is presented first.

Although the author is an engineer, the material is presented here in a general manner so that the book has appeal not only for engineering photogrammetry courses, but also for nonengineering courses taught in schools of forestry, geography, geology, agriculture, etc. With its coverage of photography, photo processing, cameras, photographic measurements, photographic interpretation, and remote sensing, the book could also serve satisfactorily for courses in interpretative photogrammetry. — **Jerome A. Gockowski,** *director Cartographic Division. SCS, Washington, D.C.*

Soil surveys

Kentucky

Estill and Lee Counties. By John H. Newton, Carl W. Hail, Thomas R. Leathers, Paul M. Love, Junius G. Stapp, Victor Vaught, and Peter E. Avers. 1974. Soil Conservation Service and Forest Service in cooperation with Kentucky Agricultural Experiment Station. 87 pp., illus.; maps.

Texas

Andrews County. By Nathaniel R. Conner, Harold W. Hyde, and Herbert R. Stoner. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 45 pp., illus.; maps.

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101

POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

Meetings

New publications

Conservation Data Bank on Rural Land and Small Watersheds. *1974. USDA Leaflet. 7 pp.* The search for data to evaluate or plan land use, solve problems of small watersheds, or further soil and water conservation begins with data summarized in the National Inventory of Soil and Water Conservation Needs. The leaflet alerts researchers to the availability of this data—now stored on magnetic tape at Iowa State University Statistical Laboratory and continually being augmented—to serve the planning and programing needs of education, government, conservation districts, and industry.

Your Woodland . . . Your Conservation Program. By Carrow T. Prout, Jr. *1974. USDA Program Aid No. 1084. 13 pp., illus.* $0.30. This pamphlet explains how, through woodland conservation, owners of forest land can protect and improve their land regardless of their objectives. It supersedes PA-463, which was entitled *Conservation on Farm Woodlands.*

December

1–3	*American Society of Farm Managers and Rural Appraisers, Inc., Convention and Trade Show, Omaha, Nebr.*
1–5	*American Institute of Chemical Engineers, Washington, D.C.*
3–6	*Western Forestry and Conservation Association, Spokane, Wash.*
5–6	*National Association of Manufacturers, New York, N.Y.*
10–13	*American Society of Agricultural Engineers, Chicago, Ill.*
12–17	*American Geophysical Union, San Francisco, Calif.*

January

5–9	*American Farm Bureau Federation, New Orleans, La.*
15–16	*National Council of Farmer Cooperatives, San Diego, Calif.*
19–22	*National Wool Growers Association and Lamb Feeders Association Joint Convention, San Antonio, Tex.*
27–31	*American Association for the Advancement of Science, New York, N.Y.*
28–30	*American National Cattlemen's Association, Las Vegas, Nev.*

February

2–6	*National Association of Conservation Districts Convention, Denver, Colo.*
6–8	*American Camping Association New England Convention, Boston, Mass.*
6–8	*Catfish Farmers of America Convention, Little Rock, Ark.*
9–14	*Society For Range Management, Mexico City, Mexico*
10–14	*Annual Eastern Snow Conference, Manchester, N.H.*
19–22	*American Camping Association Mid-Atlantic/Southern Regions Convention, Washington, D.C.*
21–24	*American Association of School Administrators, Dallas, Tex.*
23–26	*Land Improvement Contractors of America, San Antonio, Tex.*
23–26	*Sprinkler Irrigation Association Technical Conference, Atlanta, Ga.*
25–26	*American Forest Institute, Atlanta, Ga.*
28–Mar. 6	*Associated General Contractors Convention, Honolulu, Hawaii*

CORE LIST

SOIL conservation

U. S. Department of Agriculture
Soil Conservation Service
December 1974



From the Administrator

The Public is Concerned

If we needed any additional evidence of the growing public interest in soil conservation, we got it last fall in North Carolina.

For the first time in the Tarheel State, supervisors of soil and water conservation districts went on the ballot of the November general election. Prior to that, supervisors had been chosen in special rural elections which attracted little public notice.

What was interesting about these district races was the amount of excitement that they generated in the local press and among local conservation groups. In most of North Carolina's 92 districts, there was no shortage of candidates. There also was no shortage of articles and newscasts, despite competition for space and time from other election campaigns.

Commenting on the district elections, in an editorial, *The Asheville Times* observed that "soil erosion is no longer seen as only a rural problem. Sedimentation control and other conservation programs related to land use are of countywide concern."

And an editorial in the *Greensboro Record* noted: "Ecological concerns are more popular than ever before. People are coming to understand that erosion is an urban problem too . . . How the land and water are used and conserved are matters of central importance today."

Such comments should serve to remind all of us that there is an American public interested in soil conservation, concerned with soil conservation, and ready to act on soil conservation. Yet paper after paper in North Carolina referred to the board of supervisors as "obscure," to the programs as "little known," and to the work as performed "largely out of public view." We all know that this view of soil and water conservation is not confined to North Carolina; our program still lacks visibility in many, many states. In the jargon of the city public relations practitioner, we tend to have a "low profile."

The comments resulting from the North Carolina campaigns suggest that we may be shortchanging our program—and the general public—by not talking more about problems of soil and water conservation, and how they affect people all over the country.

During the past year, we made a new beginning. Local districts focused on local "Show and Tell" programs to improve their image and joined with SCS in a nationwide "produce more, protect more" campaign that is continuing into 1975. Let's build on that beginning, and, taking heart from the North Carolina experience, make sure that the American people, both urban and rural, understand that soil conservation is everybody's business.

Kenneth E. Grant

SOIL conservation

Contents

2 From the Administrator

4 Planning for the Land's Sake
John G. Scott and Robert M. Kirby

6 Beachgrass Takes Hold on Canal Spoil
David A. Nash

7 Fare for the Fishermen
George R. Ways

8 Road Washout? Dam It!
Dwight Snead and Robert L. Harryman

10 'Banking' on a Conservation Plan
Frank Jeter, Jr.

11 Spreading Lespedeza—New Plant For Erosion Problems
Harry J. Haynsworth

12 A Nature Trail for Ski Tourers
Andrew T. Stewart

16 Vegetating Stream Channels—A Multipurpose Approach
Arthur L. Bell, Edward D. Holcombe, and Vernon H. Hicks

19 Minnesota State Hospital Boasts 'Community' Outdoor Activities Area
Kent A. Alverson

20 Cooperative Effort Results in Better Plants for Wildlife
Stanley L. Swanson

21 Recon . . .

22 Soil surveys

23 Meetings

COVER: Organic soils in Florida help make that state a leading producer of winter vegetables and also require such conservation measures as flooding during the off season to reduce oxidation. The leading domestic producer of winter cabbage, Florida boasts this field on organic soils near Lake Okeechobee.

December 1974, Vol. 40, No. 5

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

The flooding of an $8 million shopping mall twice before it was a year old focused attention on problems of growth on a "filled" flood plain in Raleigh, North Carolina. County officials then developed a plan to regulate upstream development in the county to keep runoff within the capacity of the stream channel and flood retarding structures for Crabtree Creek.

Planning for the Land's Sake

by John G. Scott and Robert M. Kirby
Director of Planning, Wake County Planning Department, and soil scientist, SCS (on IPA assignment), Wake County Planning Department, Wake County, North Carolina

During the 1960's, the population of Wake County, North Carolina, rose by more than a third. Personal income rose at one of the highest rates in the Southeast.

A building boom occurred, and with it came urban sprawl and the inevitable associated problems.

Then, a situation occurred that brought into focus a problem that had been building up for years. In February and again in June of 1973 the new Crabtree Mall in Raleigh was flooded. An $8 million shopping center, Crabtree Mall is situated on a "filled" flood plain of Crabtree Creek. It opened in the late summer of 1972.

Flood losses totaled millions of dollars. Earlier flooding of the lowlands along Crabtree Creek had been a nuisance, but had failed to dramatize the conditions in such a vivid way. If urban expansion occurred in the upper reaches of the watershed, it was evident that more floods and greater losses were ahead.

The June 1973 storm was a 15-year storm, meaning such a storm can be expected once in about 15 years. This storm had put about a foot of water on the floor of the shopping mall on the flood plain. Damage was considerably worse farther downstream. It was apparent that a 50- or 100-year frequency flood would be catastrophic.

The lower half of Crabtree Creek, which drains the 91,000-acre watershed, flows through Raleigh. The flood plains within the city are fairly large, and although they have a history of flooding, development has occurred due to the irresistible attractions of flat terrain, nearness to major transportation arteries, and in-town sites. Increased urbanization in the watershed, however, would increase runoff and flooding.

Recognizing the potential susceptibility to flooding, local officials took steps to alleviate the problem.

Prior to the 1973 flooding, the county had started implementing a small watershed program with Public Law 566 assistance from the Soil Conservation Service. A soil survey of the county was published in 1972. The county planning department also requested the full-time assistance of a soil scientist from SCS.*

As a result of the combined efforts of planners, engineers, and soil scientists, the county commissioners delayed extending utilities to the upstream parts of the watershed.

The Wake County Planning Department, with the aid of SCS personnel, then started a study to determine the consequences of development in the upper parts of the watershed. Included was a calculation of the increases in runoff caused by increased impervious surfaces such as roofs, roads, and parking lots. The maximum acceptable runoff was determined by the downstream capacity of the channel or structure.

*The soil scientist supplies technical assistance in the implementation of the North Carolina Sediment Control Act and Wake County Flood Ordinance in addition to work with the Wake County comprehensive plan.

The objective of the study was to modify zoning regulations to limit the amount of impervious surfaces. To gain additional areas of impervious surfaces, developers would have to put in retarding structures.

Public officials who plan and regulate land uses must consider the need to protect the public health, safety, and welfare, on one hand, and the need to permit reasonable and equitable private uses of land, on the other. The study of Crabtree Creek Watershed, using the methods described below, offers a new objectivity and legally defensible planning criteria to meet these needs.

The published soil survey of Wake County was used to place the soils in 12 urban suitability groups.

Each soil group was assigned a color to identify it on a map. The soil maps were measured to determine the acreage of each group within a drainage area. The color patterns on the soil maps give a visual image to assist planning the extension of water and sewer facilities to areas that have suitable soils for urban development.

Soils within a group have similar behavior characteristics for many urban uses. Runoff curve numbers for hydrologic soil cover complexes as used by SCS are similar for each group. Assuming that land use is similar, these curve numbers are used in estimating runoff volumes and peak flow rates for the areas under present land use conditions and after urban development.

The retarding structures in the watershed, when completed, will control the runoff in their respective drainage areas expected from a 100-year frequency storm. Storage of sediment is also included in the design of each structure.



Floodwaters of Crabtree Creek put about a foot of water on the floor of the newly opened Crabtree Mall shopping center in northwest Raleigh in June 1973.

Hydrologic conditions change as the amount of impervious surface increases. About 98 percent of the storm water falling on impervious surfaces will flow rapidly into the floodways. Where slopes are significant, this runoff will cause flow peaks that exceed flows of comparable rural areas. In the Raleigh area, urban developments have impervious surfaces that cover about 30 percent of the land. Other land cover consists of grass, lawns, shrubs, shade trees, and some farmland with forests.

Where land use and cover are similar for two soil suitability groups, as an example, and one has soil characteristics that retard runoff while the other does not, the county would permit more impervious cover on that group where soil characteristics retard runoff.

Planners must direct the development in a watershed so that runoff will not exceed the designed capacity of the flood retarding structures or the capacity of the stream channel.

Therefore, it is important that the impervious areas of the watershed be carefully regulated. In drainage areas where flood retarding structures are built or planned, the known capacity of the structure should determine the total permissible impervious surface of the drainage area.

This impervious surface can then be apportioned to land owners and developers. If a developer seeks to construct large areas of parking lots, roads, and other impervious areas which would generate greater runoff than that allocated for his development area, supplementary flood control measures must be constructed. These must have the capacity to control the excess runoff caused by his development work.

This approach to land use planning will be expanded to other parts of Wake County where urban development may create serious flood hazards in the future. In drainage areas where flood retarding structures are not planned, the capacity of the floodway to transmit the runoff will be used to compute permissible impervious area of the watershed. ♦

Beachgrass Takes Hold on Canal Spoil

by David A. Nash
District conservationist, SCS, New Castle, Delaware

On a cold breezy morning one February, 30 Boy Scouts broke frozen ground to plant 'Cape' American beachgrass along the Chesapeake and Delaware Canal.

Their task: to put 25,000 plants on a test plot of 1 acre of heretofore sterile spoil. If successful, the plantings would stabilize steep slopes and fields of dredged sand and help keep sediment out of the canal. The canal, a manmade ship channel, connects the Chesapeake and Delaware Bays.

Miles of precarious embankment along the canal had been successfully vegetated by agronomists of the University of Delaware and the Soil Conservation Service, but this particular acre is 1 of 1,200 acres of spoil which had presented persistent problems. Dug from extreme depths of 50 to 100 feet or more in the channel, the spoil had soil conditions so varied that from spot to spot the texture could range from loamy sand to silty clay loam and the soil acidity from a pH of 2.5 to 6.5.

SCS's plant materials center in Cape May Court House, New Jersey, had furnished the plants for the Scouts. Chuck Mowry, SCS plant materials specialist, had suggested 'Cape' American beachgrass since nothing else had survived in trial plots on the site.

The Boy Scouts, led by Scoutmaster Richard Robinson, planted the beachgrass 18 inches apart, using three plants per spot, in staggered rows for maximum erosion control.



The author inspects the first year's growth of 'Cape' American beachgrass on a spoil flat by the Chesapeake and Delaware Canal.

Beachgrass is well adapted for stabilizing sand dunes along the shore, but the question was whether it could survive the harsh conditions of the spoil banks. In addition to the variations in soil, high winds continually blow across the top of the disposal areas.

'Cape' American beachgrass is a variety of beachgrass released in 1972 jointly by the SCS's plant materials center in New Jersey and by Rutgers University for stabilizing and building sand dunes. (See SOIL CONSERVATION, September 1974).

Over a period of a year, the grass planted by the Scouts did little but trap some blowing sand. Then last spring, the brown plants that appeared to be decaying sprouted green shoots. Within a month later, 35 percent of the plantings seemed healthy and were producing new plants by lateral runners.

The test plot—which had remained virtual desertland for 12 years despite numerous attempts to vegetate it—now has rapidly spreading beachgrass that forms a good ground cover.

The Scouts will tell you that it was their hand labor that made the difference. ♦

Fare for the Fishermen



Trout start jumping when Jeff Bowers scoops feed into the raceways on his father's farm.

by George R. Ways
Soil conservationist, SCS, Franklin, West Virginia

A coon hound usually trees raccoons. In West Virginia there is one that also catches trout, helping herself from the fish-and-pay trout ponds at Rainbow Farm.

Like any other commercial farmer, owner William H. Bowers works for a profit, but he doesn't worry about losses from the occasional visits of the fish-catching hound. It adds to his enjoyment of the unusual, and at Rainbow Farm, the unusual is normal.

Other nonpaying guests to the ponds include osprey, herons, and mink that await their chance to slip in for a helping of fish.

Two half-acre ponds provide the public a place to fish for rainbow and brook trout. The serene rural setting at Sugar Grove in West Virginia's Eastern Panhandle attracted about 1,000 people for weekend fishing in 1974 from April through July.

"I built the ponds in 1957 for my family's recreation," Bowers said. "Because everyone else wanted to fish there, I opened them to the public for fee fishing in 1964."

Bowers went to the Potomac Valley Soil Conservation District for technical help from the Soil Conservation Service in the survey, design, and construction of the ponds. His spring-fed stream was dammed to create the clear, cool trout ponds.

Working with the district on his ponds and on other conservation practices on his farm, Bowers became interested in soil and water conservation programs and was elected a district supervisor from Pendle-

ton County in 1970. He now aids the district and the Soil Conservation Service in helping others practice good land use management.

As a district supervisor, Bowers has helped secure land rights for construction of flood-prevention dams in the South Fork Watershed Project. The district is cosponsoring the upstream watershed project with the Pendleton County Court. Twenty-one of the planned 24 dams have been built and another is under construction. Bowers' 1,300-acre farm is in the upper reaches of the watershed.

In addition to his trout enterprise, Bowers had 70 sheep, 50 Angus beef cows, and 30,000 turkeys in 1974 and made 40 acres of hay. "Believe me, this really keeps you busy," he said.

Bowers continues to experiment with the capabilities of the soil and water on his farm. He planted 2 acres in buckwheat for wildlife food in 1974 and made a field trial planting of sericea lespedeza for summer pasture. He also raises channel catfish in warm-water ponds on Rainbow Farm.

For his fee-fishing ponds, Bowers buys about 12,000 fingerling trout yearly from hatcheries and feeds them on commercial trout chow for 2 years. The fingerlings live in five raceways Bowers designed until they are 12 to 15 inches long. Then they are stocked in the ponds. The raceways are 12 feet wide, total 300 feet long, and have a continuous waterflow.

Fishermen pay 11 cents an inch for fish between 10 and 20 inches long. Any fish caught less than 10 inches long or more than 20 inches is free. "Each year I put a number of these in the ponds. It's good business," Bowers said. ♦

Road Washout? Dam It!

by Dwight Snead and Robert L. Harryman
District conservationist, Unionville, Missouri,
and Green Hills RC&D project coordinator, Bethany, Missouri

Landowners in Putnam County, Missouri, aren't alarmed when water starts lapping at the edge of their roads. They planned it that way by building roadbeds that also serve as dams.

Combining a road and water-impounding dam into one structure isn't a new idea, but



Gully erosion that undercuts roads can sometimes be controlled by dams.

it is one many township boards and county courts have been hesitant to use.

Conservation-minded landowners in western Putnam County are among the state's leaders in terms of the number of road-dams (technically known as stabilization structures) built.

Since 1970 when the first road-dam was built by Hershel Cooley, 11 more have been constructed, most of them in York Township. Cooley needed a dam to stabilize a gully above the road and one below to store water for livestock. Here, the township furnished the pipe and the landowner did the earthwork. The road-dam saved the landowner valuable land and the cost of a second dam as well as improving the road.

At the Wilburn Collins farm, a 48-inch culvert was replaced with a road-dam. By building up the road and impounding a quarter acre of water, Collins was able to stabilize a gully and also to reduce the size of the pipe to 8 inches.

At another farm, two 36-inch culverts were replaced with one road-dam and one 18-inch pipe.

And at the Trulan Dunkin farm, where a 48-inch corrugated pipe washed out nearly every year, a road-dam was built in 1971 that required only an 18-inch smooth steel pipe.

"Even with all the rain we had in 1973, the road-dam worked perfectly," commented Jim Boland, York Township official.

Getting a road-dam takes the cooperation of the landowner, the township board, the county court, the soil and water conservation district, and the Soil Conservation Service. Usually the landowner provides the site for the borrow and the pool, the township pays for the earth work, and the county court pays for the pipe. SCS surveys, designs, and supervises the construction.

"Not all sites are suitable for road-dams," Bill Riggs, SCS engineer in Bethany, Missouri, points out. "Some may be too flat or may not have a suitable pool area, while others may have too much drainage area.

"The best sites have a deep, flat valley between two hills, allowing the maximum storage with a small fill. Even if the site meets these requirements, it may be dropped because of water lines, power lines, or buried cables that prevent digging.

"Where they are practical, road-dams work well. They don't have the problems that culverts have with trash or silt plugging the inlet. The pipe can be made to flow full of water; therefore, smaller pipes can normally be used." ♦

This dam northwest of Unionville, Missouri, corrects a washout problem and also provides water for livestock and wildlife.



'Banking' on a Conservation Plan

by Frank Jeter, Jr.
Public information officer, SCS, Raleigh, North Carolina



Erosion resulting in heavy silt deposits such as in this watercourse was among the problems Northwestern Bank brought under control through conservation measures.

A new office complex south of Wilkesboro, North Carolina, looks as if it were built on an attractive hilltop.

But only a few years ago, a good part of the 50-acre site was affected by erosion. Sediment from steep slopes flowed into nearby streams, and big gullies traversed large portions of the land.

The Northwestern Bank, fifth largest in North Carolina, purchased the site in 1972 for an office complex—and found that quite a few problems came with it.

The land had been bulldozed and large areas had no vegetation. The idle land had received little care to control surface water. Rainfall had gouged gullies across the uneven, hilly terrain. A nearby mountain stream ran red with mud during frequent rains.

Checking out some of the conservation measures taken are Gray Ashburn of the Northwestern Bank and John Nelson, district conservationist for SCS. The heavily grassed hilltop and asphalt waterway help control erosion.



This condition did not last long. George B. Collins, president of the Northwestern Bank of North Wilkesboro, which was building the office complex, is an enthusiastic conservationist who has served as a district supervisor with the Wilkes Soil and Water Conservation District and as president of the North Carolina Association of Soil and Water Conservation Districts. Collins quickly made plans to make the gullied site a model of conservation.

The bank sought the help of the Wilkes Soil and Water Conservation District and the Soil Conservation Service (SCS). District Conservationist John Nelson of SCS prepared a complete conservation plan for the tract, aided by Remer Dekle, an SCS civil engineer.

The plan included diversions to control runoff, drop inlets to control water moving from high to low ground, sloping of vertical banks to reduce steepness, and establishment of grass and other ground cover to prevent water and wind erosion. These steps would be augmented by planting of white pines on selected areas. Excess soil from sloping the steep banks would be used to form construction areas on lower levels.

"We hired a contractor immediately," said Gray Ashburn, agricultural representative of the bank and himself a soil and water conservation district supervisor.

"To accomplish the conservation goals, the contractor had to move more than a half-million cubic yards of earth. He also handled seeding and planting."

On some of the steep slopes, the contractor used a hydroseeder, a specialized device mounted on a truck to spray a mixture of seed, fertilizer, and lime on steep areas in one quick pass.

The results are spectacular. The area is planted, sloped, and controlled to provide a picture of conservation. The nearby stream runs clear. A large new office building, a plant shop, and an automobile service area have been completed, and another site is being developed for a second large office building.

In keeping with Northwestern Bank practice, enthusiastically promoted by Collins, landscaping is done no matter whether a new office has a large or small site. Shrubs are planted and grounds are well tended.

"We think it's a combination of good business and good sense," said Ashburn. ♦

Spreading Lespedeza—New Plant For Erosion Problems

by Harry J. Haynsworth
Plant materials specialist, SCS, Athens, Georgia

Spreading virgata lespedeza (**Lespedeza virgata**) is a new plant that is very effective in controlling erosion on highway roadbanks, road cuts, fills, and borrow areas.

Introduced into the United States in 1954 through the New Crops Branch of the Agricultural Research Service, this plant, native to Japan, was tested first at the Americus, Georgia, Plant Materials Center. These tests, by the Soil Conservation Service and the University of Georgia Agricultural Experiment Stations, started in 1957.

Later, Spreading lespedeza was tested extensively on Georgia highway roadbanks and then on problem sites in other southeastern states. It proved to be well adapted in the Upper Coastal Plain, Piedmont, and lower mountain elevations, and through most of

(continued on p. 15)

Joseph A. Carey (center), soil conservationist in Oglethorpe County, Georgia, looks at Spreading virgata lespedeza with visitors from Turkey.



A Nature Trail

by Andrew T. Stewart
Winter naturalist, Waterville Company, Inc., and
district cooperator, Grafton County Conservation District,
Enfield, New Hampshire

Witches' brooms, cradle knolls, goosefoot, rum cherry, and manna from heaven—all five are common sights for the thousands of ski tourers gliding through New Hampshire's forests every winter, but most ski right on by oblivious to these silent but eloquent members of the environment.

Our conviction that ski tourers could gain more satisfaction from their sport led, after a summer of exploration and work, to the following invitation engraved on a wood sign next to the Waterville Valley Ski Touring Center:

The Boulder Nature Trail
Ski through winter—Discover where you are
Your guide—the red signs and your five senses
Follow the track on the 1½ mile loop.

Skiers who accept the offer find a trail, long used for hiking, that is ideal for nature study. The variety of habitats includes open field that is actually an old downhill ski slope, northern hardwood uplands with occasional clearings, microclimates created by steep north facing slopes that support thick stands of fir and spruce, and a long stretch of the Mad River. There is even a short side trip to an active beaver pond.

Views of the White Mountains take on new meaning:

Glaciation
If you'd arrived 20,000 years sooner, you'd be under a mile of ice. You still can see how the glacier moved up the gradual north slope of Mt. Tecumseh opposite you but plucked many feet of rock from its steep south slope.

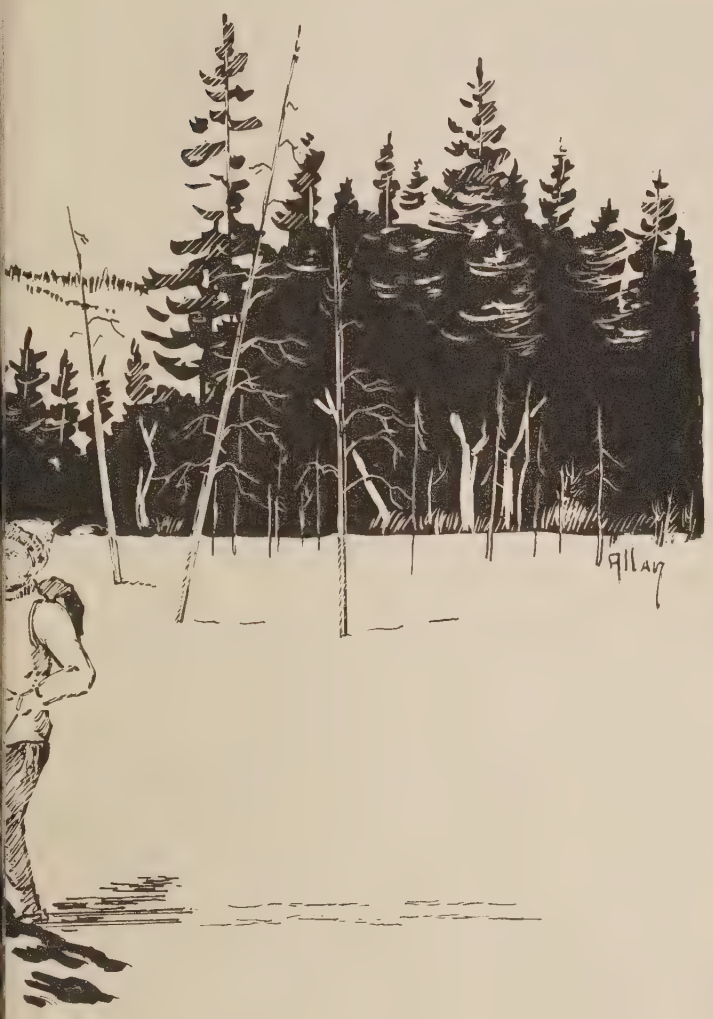
Throughout, the objective is to communicate on a personal and stimulating level with trail users of all ages. To be meaningful, the information has to go beyond Latin labels and statistics that rattle briefly in the mind like dry seeds in a gourd. Fortunately, we contacted the Grafton County Conservation District office in Woodsville, and Mike Dannehy, district conservationist for the Soil Conservation Service, put us in touch with Dave Allan, an SCS biologist operating out of Durham. Dave, who spent many hours going over the area with us, combines an intimate knowledge of the natural environment with a wealth of local lore and personal insight into the varied forms and stages of life along the trail:



A beaver lodge attracts ski tou

River Erosion
Now you're on a flood plain created by the river after the glacier melted back. The swift, rock laden current contoured the bank. What

or Ski Tourers



as they cross a beaver pond.

differences do you see in tree growth? Climate and soil govern forest types.

Boulder Life

Years ago lichen started to break down this granite surface. Mosses took hold, forest litter rotted to build a bit of soil. Forty years ago the little spruce sprouted beside the yellow birch. Environment has limited its growth.

To complicate matters we had to remember that snow would be blanketing much of what we could see:

Cradle Knolls

You are passing through an area of hummocks or cradle knolls produced by the ripped up roots of trees thrown by the hurricane of '38. Has snow erased the contours?

Many times the signs prompt the skier to personalize his response, to go beyond the intellectual, to use all his senses:

Shhh

You're now well into the forest. Do you see any birds? Close your eyes and listen. Would wind whisper or rattle through these branches? Look at the sky. Are the trees thick enough to protect you in a storm?

Farther along the trail a comparison is requested and a decision called for. The skier feels the immediacy of his environment. No longer is he merely passing through:

Self Pruning

These trees are pruning themselves. Lack of sunlight causes lower branches to die and eventually fall off. Look for the sky. Listen for the wind. Would you camp here for the night or up in the northern hardwoods?

The signs are intended to reflect concern for the individual's well-being as well as the learning process:

Black Cherry Tree

Hope you made that dip O.K. It brought you down to a newer flood plain. This black cherry tree provides fruit for humans, birds and small mammals. The bark can be used medicinally and as a flavoring extract.

Where the trail crosses the river we labored long and hard to construct a sturdy log bridge, dubbed Johnsen's Jump. The nearby trail sign carries a powerful lesson in stream ecology:

Johnsen's Jump

Johnsen's Jump spans Mad River, part of the Merrimack watershed, largest in N.H. Life in a mountain stream must adapt to a swift flowing environment. The bridge, tho' strong, is neither streamlined nor able to hold fast to stones and will go out with the ice this spring.

Sometimes a question with no clear answer strikes closest to truth:

Standing Soil

This yellow birch stub being broken down by small insects, fungi and microorganisms is returning essential minerals and nutrients to the soil to strengthen growing plants. It is but one



link in the great chain of life. Is birch veneer as beautiful?

Yet purely scientific information need not forego the dynamics of life:

Plant Growth Movement—Tropism
When young this black cherry was bent left by a falling tree. Its growth has been both a response to gravity (geotropism), for it wants to grow upward, and a struggle for light (phototropism), for it needs sun to live.

The trail's length, 1-1/2 miles, proves ideal for skiers. The signs, 46 in all and laboriously inscribed with an engraver on 3- by 5-inch laminated plastic plaques, take about 1 hour each to complete, but the results are worth the effort. Impervious to weather and easily visible against the snow-covered trees, they look attractive and professional. They are mounted on 6- by 7-inch boards bolted to posts along the trail. As snow accumulates, the signs can be rebolted higher on the posts. The environmental interpretations are spaced more frequently on the first half of the trail when skiers are freshest; as skiers' strength wanes, fewer signs demand their attention. In all cases messages are kept sufficiently brief to prevent pronounced shivering on cold days. Of course, a written pamphlet could have served as the guide for a numbered trail. This possibility was rejected because of the clumsiness of hands in mittens and the litter problem.

As for vandalism, there has been none at all. We chalk this up to the traditional gentility of ski tourers. Frost action has been the most destructive force, and in the future the wooden sign bases will be routed to receive the plastic plaques and thus prevent water from seeping between the two, freezing, and breaking the epoxy bond. We should have foreseen this:

Frost Crack
You saw a small poplar on the ski slope. This larger one has a black scar healing a frost crack. Water seeps in, freezes, expands and widens the split.

Dave Allan's assistance extended beyond the nature trail to the Environmental Center, where, at his suggestion, we prepared instructional displays for twig and bud identification and for wildlife tracks. A complete collection of stuffed birds and animals native to the Waterville Valley area was loaned us by Bob Chaffee of the Dartmouth College Museum and has proved very popular. Receiving the greatest response, however, has been a 4- by 8-foot painting by Boston's Florrie Everett of the fiercest snow flea in the state.

The winter's high point was the unification of ski touring lessons, winter camping techniques, and all of our environmental study procedures into a week-long course for a nearby college. The last night of the session found 20 students with their instructors camped in the White Mountains on a highland meadow far from the nearest road. Firelight played sunset on the snow:

You're on your own now—no signs. You'll see many trees you know, dens, woodpecker workings, flood plains, maybe even a tree burl. Stop occasionally to listen and search out more than any sign can tell. ◆

(continued from p. 11)
the loess belt in Tennessee, Mississippi, Arkansas, and Louisiana.

An attractive plant with long, fine stems that give it a spreading appearance, Spreading lespedeza provides a dense enough and high enough cover to suppress most undesirable plants. The new growth is bronze-colored, blending into the rich green of older oval-shaped leaflets.

Based on the tests made at the plant materials center and on problem conditions in several states, Spreading lespedeza was recently certified by the Georgia Crop Improvement Association. It was released in the spring of 1974 by the Soil Conservation Service and the University of Georgia Agricultural Experiment Stations.

Although Spreading lespedeza seed is not available from commercial sources at the present, certified seed will be available very soon. Seed production is good, with yields and methods of handling about the same as for sericea lespedeza, which in the past has been effectively used on many of the same problem areas as the newer plant.

Sericea lespedeza, however, is taller and has a coarse texture that does not provide the pleasing appearance desired for some locations.

Another advantage of Spreading lespedeza over sericea lespedeza for roadbanks is that it is more tolerant of mowing.

Spreading lespedeza is planted in the same manner and at the same rate as sericea lespedeza. Hydraulic seeding equipment can be used very effectively in planting the seed on steep slopes and in other problem situations. ♦

Wind Erosion Checked With Feedlot Waste

Besides increasing soil fertility, cattle feedlot waste may be a means of controlling wind erosion on cropland, according to a recent study by USDA's Agricultural Research Service (ARS).

ARS scientists have prepared reference graphs from their research for the Soil Conservation Service to use in determining the amount of feedlot waste needed to reduce wind erosion in various field situations. The amount of waste required varies with soil texture and roughness as well as the application method.

The ARS field plot studies, conducted in cooperation with the Kansas Agricultural Experiment Station at Manhattan, show that animal waste—which can be a water pollutant in the feedlot—is about as effective as anchored straw in restricting soil loss from highly erosive sandy soil.

Soil loss was reduced from about 4 tons per acre to less than a half ton where at least 30 tons (wet basis) of animal waste per acre were tandem-disked into the soil or where 15 tons were spread on the soil surface. This 88 percent reduction in soil loss—compared with unprotected plots—was on soil averaging 74 percent sand, 20 percent silt, and 6 percent clay.

The measurement was taken on the second day after application, following the use of a portable wind tunnel operating at a windspeed of 36 miles per hour to simulate wind erosion.

A second measurement in May, after the animal waste and straw had weathered over the winter, showed that at least 15 tons of animal waste per acre, surface applied, or a half ton of anchored straw reduced soil loss by 90 percent. Sixty tons of tilled-in animal waste were needed for equal protection.

The researchers noted, however, that more than double the usual over-winter precipitation at the test site caused soil crusting and extremely low susceptibility to wind erosion in May.

They reported several advantages to tilling-in animal waste to restrict wind erosion. These include minimizing the likelihood of surface runoff carrying high concentrations of pollutants and retaining more of the fertilizer value of the waste because less of the nitrogen is lost into the air. Also, tilling-in provides an outlet for at least twice the amount of animal waste as surface application. ♦

Natural Resources Is Program Theme For NSA for 1977

The National Secretaries Association (NSA) has selected natural resources as its 1977 Program of the Year, and is working with the Soil Conservation Service and the National Association of Conservation Districts regarding information on conservation of natural resources.

The educational "Program of the Year" is developed 2 years ahead of presentation to members. NSA has more than 750 chapters and 33,000 members in the United States and Canada. In addition, it sponsors the Future Secretaries Association, which has more than 450 chapters and 11,300 members. ♦

An interdisciplinary team tells of planning vegetative treatment prior to stream channel construction to minimize disturbance of natural vegetation and to select multipurpose plantings for the disturbed areas.



An aerial view shows a channel constructed leaving natural vegetation.

Vegetating Stream Channels—A Multipurpose Approach

by Arthur L. Bell, Edward D. Holcombe, and Vernon H. Hicks
Conservation agronomist-Watersheds, field specialist-Woodland, and biologist, SCS, Temple, Texas

The vegetative treatment of stream channels that have been modified with Soil Conservation Service help begins during the planning stage.

An interdisciplinary team studies the area to locate any natural areas that can be left undisturbed during channel work.

Then plans are made to disturb natural vegetation as little as possible during and after construction of the channel, while meeting the objective of the channel work.

SCS aids local groups in channel modification as a flood prevention and watershed protection measure where other land treatment or structural measures are not feasible or cannot do the job alone. Basic aim is to restore the ability of the channel to hold water and move it safely downstream.

During the planning stage, SCS develops a detailed vegetative plan for all sections of the channel. The interdisciplinary team's report serves as a guide to the planning party in alignment of the channel and in location of sites for deposition of spoil. Insofar as economically and

environmentally feasible, the maximum amount of natural vegetation is left right up to the edge of the channel itself.

One method to minimize disturbance of natural vegetation is to plan alignment and size of the channel while leaving natural vegetation on one side. Excavation is done from the other side with the spoil deposited and spread on that side.

As the work progresses, excavation is done from alternate sides, thus staggering the spoil and the leaving of natural areas. This creates a more esthetic appearance by breaking the monotony of continuous spoil on one side. It also gives landowners on both sides of the channel access to undisturbed areas of woody vegetation.

The vegetative plan is designed to accomplish several objectives. Erosion control of disturbed areas is the primary concern. Consideration is also given to vegetation useful as food and cover for wildlife as well as useful for the maintenance or improvement of the esthetic values of the area. Therefore, a combination of grasses and woody vegetation is planned for multipurpose use.

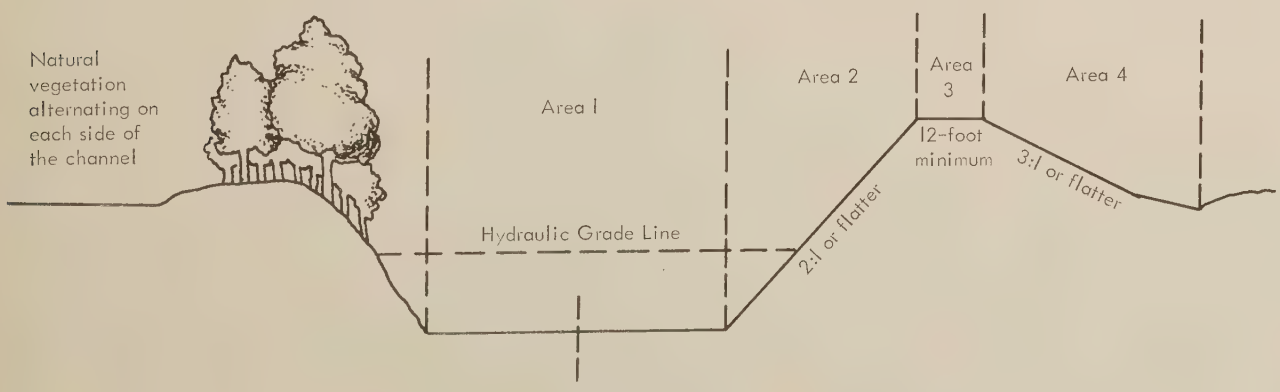
An example of a channel cross section is shown in the accompanying diagram. The natural vegetation has been left on one side. All excavation has been done from the other side and the spoil has been shaped. The vegetative plan gives consideration to all areas which have been disturbed. The entire section is divided into areas which may need different vegetative treatments to meet the objectives of the plan. These areas are delineated on the cross section.

Area 1 includes the channel bottom. Species from the Soil Conservation Service's plant materials center will be established and evaluated at locations within this area where stablization is needed. Such species as prairie cordgrass, common reedgrass, and switchgrass could be used. A detailed plan will be developed before such plant materials are used.

Area 2 includes the channel cut slopes and the front side of the spoil. In this example, no berm is left between the top of the cut slope and the front toe of the spoil. The primary objective of vegetation in this area is erosion control. A grass such as Selection-3 bermudagrass will be sprigged here. Establishment by sprigging is more reliable because the danger of losing all vegetation during flooding is reduced. The sprigs also become established more quickly, thus assuring earlier cover. Grasses such as Kleingrass-75 and/or switchgrass will be seeded above the hydraulic gradient for wildlife food. If space permits,

---

PLANNED PERMANENT VEGETATION ON A STREAM CHANNEL. This cross section illustrates plant materials that might be planted on a channel. **Area 1—the stream bottom.** Species from the plant materials center are evaluated and established at locations where stabilization is needed. **Area 2—the channel cut slopes and front side of the spoil.** Selection-3 bermudagrass overseeded with Kleingrass-75 and three rows of dewberries. Kleingrass-75 and dewberries have both wildlife food and cover value. **Area 3—the crown of the spoil after it is spread.** Selection-3 bermudagrass overseeded with Kleingrass-75 or bahiagrass. **Area 4—the back slope.** Selected woody plants and grass mixture selected for erosion control, esthetic value, and as wildlife food and cover.





Natural vegetation remains on either side of this channel constructed in an urban area.

three rows of vines such as dewberries may also be planted for food and cover for wildlife.

Area 3 is the crown of the spoil after it is spread. This area will be used for maintenance access since no berm is planned in this example. Selection-3 bermudagrass will be sprigged and grasses such as Kleingrass-75 will be seeded to provide multipurpose cover.

Area 4 is the back slope of the spread spoil plus any disturbed area within the permanent easement. The grass mixture here will be compatible with the land use of adjacent fields. For example, bermudagrass is not usually sprigged adjacent to a cultivated field. These sections are seeded to grasses such as Kleingrass, switchgrass, indiangrass, or bluestem. This enhances the wildlife value while still providing adequate cover. Selected woody plants will be planted in clusters—or motts—to provide wildlife food and cover. These plants will also improve the esthetic value of the channel right-of-way. The woody plants include trees such as pecan, walnut, mulberry, oaks, and crabapple. Shrubs may include Russian and autumn olive and bush honeysuckle. Some vines such as dewberry, grape, and honeysuckle may also be included in the motts.

The motts of woody vegetation would be spaced about a quarter of a mile apart on the spoil. Each would be fenced to prevent grazing by domestic livestock while still providing access to wildlife. Motts would also be placed adjacent to any road crossing the channel.

The permanent easement may be fenced to control grazing in sections where livestock are present. Other sections are left without fencing if the land use does not include livestock in the foreseeable future.

The vegetative plan establishes time limits for the establishment of permanent vegetative cover. If the construction of the channel is completed 2 months or more before the time that permanent vegetation can be established, temporary cover is used to control erosion. This is followed by site preparation and establishment of permanent cover during the applicable time of the year. Cover is quickly obtained regardless of when construction is completed.

Plant materials evaluation continues and trials are continuously underway on watershed works of improvement. This work includes the use of both native and introduced species of plants. The evaluations include erosion control, esthetic values, and wildlife food and cover values. Thus, multipurpose vegetation is assured on all disturbed areas after construction. ◆

Minnesota State Hospital Boasts 'Community' Outdoor Activities Area

by Kent A. Alverson
Head, Information Unit, TSC, SCS, Lincoln, Nebraska

What was once a farm at Minnesota State Hospital at St. Peter is now an outdoor learning and recreation area, used year-round by hospital patients, local students, teachers, and other individuals and groups.

Begun only 5 years ago when agriculture was phased out of the hospital's program, the 115-acre area includes a pond large enough for boating and fishing, nature trails, and woodland and wildlife plantings that attract deer, waterfowl, and other wildlife.

Prime movers in converting the farm into an outdoor learning project were Tom Swanson, program supervisor for the patients, and Duane (Dewey) Goerend, district conservationist for the Soil Conservation Service.

"When I was given the job of developing this land, the first person I contacted was Dewey," said Swanson. "He came up with lots of great ideas—such as the fish pond, grassland terraces, and nature trails. The state's Department of Forestry, the wildlife manager, and the Department of Fisheries were all very cooperative."

The outdoor activities area has a complete land use and conservation plan prepared in cooperation with the Nicollet Soil and Water Conservation District. Most of the work scheduled in the 5-year plan was carried out in 4 years with federal and hospital funding.

Almost all of the work in the beginning, including the roads, was done by hand by recreation staff and patients. Later, they were joined by the Teen Corps, a group of students who volunteer to work on camp projects. Private donations have included the headquarters and classroom building.

The hospital's three institutions each use the day camp and nature areas differently.

The Minnesota Valley Adaption Center for the mentally retarded, with 350 persons enrolled, has highly structured activities—such as crafts or boating or fishing—with precise scheduling.

The St. Peter state hospital for the mentally ill and chemically dependent takes care of nearly 300 persons and has a more casual schedule—such as crafts in the morning and a choice of pursuits or just relaxing in the afternoon.

The Minnesota Security Hospital, with about 100 men who are considered dangerously insane, uses the area as a leisure-time camp. All patients are closely supervised by staff personnel.

Last year, patients and residents on the hospital campus spent 22,000 hours in day camping. Outside groups such as the YMCA, Gustavus Adolphus College, and 4-H Clubs spent another 12,000 hours at the day camp. For 4 years Mankato State College has used the site for teachers' workshops, attended annually by 60 or more teachers.

A big bonus from the recreation and study area has been improved public relations, according to James Littig, assistant administrator of the hospital.

"People don't usually come to visit the hospital, but they will visit the recreation area.

"We thus get a mingling of community residents and patients. It's a revelation to many that our patients are real people with a problem. It brings the institution and the city closer together." ♦

Both patients and community residents use the outdoor learning and recreation area at Minnesota State Hospital at St. Peter.



Cooperative Effort Results in Better Plants for Wildlife



Del Sanford, biologist with the Oregon Wildlife Commission, checks a plant trial in the Sauvie Island Wildlife Management Area.

by Stanley L. Swanson
Manager, Corvallis Plant Materials Center, SCS, Corvallis, Oregon

One of the primary aims of the Soil Conservation Service is to help the owners of the nation's private lands improve habitat for wildlife. Since the SCS is always on the lookout for plants for all conservation uses, it assembles, tests, and guides into commercial channels plants that offer food and cover for wild animals.

It was a natural consequence, therefore, that SCS began working with the Oregon Wildlife Commission, which in its efforts to improve conditions for wildlife has many of the same concerns. For 12 years the two agencies have used a broad but concisely stated formal agreement as a basis for their cooperation. An objective, according to the agreement, is to provide more nearly adequate feed sources for big game, waterfowl, upland game birds, and songbirds. Erosion control and soil improvement are additional objectives of the cooperative effort.

This cooperation helped lead to the release, in the spring of 1971, of 'Marshfield' big trefoil to commercial seed producers. Following favorable early results in Agricultural Research Service tests, the superiority of Marshfield was shown during extensive testing at the SCS Corvallis Plant Materials Center and at the Wildlife Commission Sauvie Island Wildlife Management Area north of Portland.

In the Sauvie Island work, Marshfield big trefoil was compared with three other trefoils. All were seeded with meadow foxtail. These grass-legume plantings served as pasture for both livestock and migrating geese and widgeon. Marshfield big trefoil and meadow foxtail proved to be an excellent combination because of their tolerance to wet, acid soils and their high palatability. In combination with various grasses, Marshfield big trefoil is also being tested in coast range plantings used by deer and elk, and has wildlife value where seeded in the deflation plains formed along the landward side of coastal foredunes.

Transmission line construction through the coastal mountains is offering opportunities to test grasses and legumes for big game use as well as for erosion control. In the lower rainfall zones, 'Cascade' birdsfoot trefoil and orchardgrass are among the top performers. Big trefoil is seeded instead of birdsfoot trefoil where annual rainfall exceeds 60 inches. Trial seedings have led to quality plantings for game.

Oregon Wildlife Commission and SCS personnel have also developed cultural and management methods for establishing and maintaining stands of many plants they have tested. Seedbed preparation on fine textured soils has been a major obstacle to successful seedings, particularly where wetness is a problem. Use of a tractor-drawn rototiller has overcome this problem in tests at the Corvallis Plant Materials Center. Wildlife Commission personnel have done an ex-



At the SCS Corvallis Plant Materials Center, seed is harvested from 20-foot observation rows for yield data.

ceptional job of using "Atrazine," a selective herbicide, for establishing essentially weed-free stands of corn, sudangrass, and proso millet. Other management "tools" have included fertilizing, grazing, annual tillage, and mowing.

Many benefits have been gained for western Oregon from the work at plant materials centers in adjoining states. These centers, located at Pullman, Washington; Aberdeen, Idaho; and Lockeford, California, are also working closely with their respective state wildlife agencies. All three centers have shared plants they have selected, as well as information on culture and management.

Testing of plants for wildlife is a slow process, requiring a wide range of abilities. But results to date have been particularly encouraging because biologists and agronomists in federal and state agencies have worked together to systematically set priorities, plan and conduct testing, and evaluate results. ♦

Recon . . .

A real conservative 2 million gallons. The state may have more oil than you can shake a derrick at, but even Texas can't afford to waste fuel. Consequently, Texas farmers are real happy about the 2 million gallons of tractor fuel they saved this year by using minimum tillage. The new tillage method, which reduces the number of passes a farmer has to make over a field, is reported on 367,000 Lone Star acres. Although that's the reported figure, SCS in Texas projects the actual amount of minimum tillage in the state to cover up to 750,000 acres this year. But even at the most conservative possible figures, the Texans are 2 million gallons to the better, making minimum tillage a real WINner.

Habitat critical for rare warbler. As the mature cedar goes, so goes the golden-cheeked warbler. That's the conclusion reached in a recent Texas Parks and Wildlife Department study of the rare little bird which nests in mature juniper or cedar communities in central Texas. The department and the Soil Conservation Service are disseminating information on how landowners can preserve habitat for the birds. The department's nongame program received additional funding from the legislature to help maintain the warbler's habitat. Nevertheless, authorities report, habitat is being destroyed through brush clearing and subdividing throughout the golden-cheek's range.

Home on the unusual range. In addition to assistance to ranchers and other conventional livestock producers, Florida conservation districts are assisting in the planning of new livestock operations for "nonconventional" producers. These include such unlikely cattlemen as Walt Disney World, the Avon Park Bombing Range, several large paper companies, and several land development companies. Emphasis is placed on multiple land use. In many instances, cattle are being used to control and manipulate excessive vegetative growth in order to improve wildlife habitat.

Notice: Bargain - hunting antique car enthusiasts who like to look for junked autos on back roads are advised to forget about the Five Rivers Resource Conservation and Development Project area of Tennessee—the junk cars are gone. The RC&D Project in a cooperative venture with the

U.S. Army at Fort Campbell and the Tennessee Valley Authority, has collected and disposed of thousands of the clunkers.

Conservation weathers bad weather. Indiana had one of those seasons farmers dread this year. It was so wet this spring that planting was often delayed. Then a bout of dry weather in July reduced yields still further. According to SCS State Conservationist Cletus Gillman, however, some farmers managed to mitigate the weather's impact through mulch tillage and no-till planting. The shorter time required for planting allowed many farmers to complete the job before the spring rainy season began. The fields covered by mulch residue stood the drought conditions better than crops on plowed seedbeds. Gillman reports, "These early planted crops display the greatest potential for near normal yields."

Navy soil survey completed. SCS finished a special soil survey of the Guantanamo Bay area of Cuba in 1974. The survey, an aid to the U.S. Navy in development of forestry, fish and wildlife, outdoor recreation, and other resources, put special emphasis on recommendations for fresh water impoundments and sources of road fill materials. Guantanamo Bay is the naval base administered by the United States under a lease from Cuba.

GRAND LARSeny. SCS has assigned a soil scientist to work fulltime with Purdue University on some grand LARSeny. LARS—the Laboratory for Applications of Remote Sensing—is working on a major NASA-funded program to promote the use of remote sensing. So far, eight projects have been initiated which use remote sensing technology as an aid in the management of the natural resources of Indiana.

New York loses a ton of soil in under 2 seconds—OOPS! there goes another one! The Erosion and Sediment Survey begun by SCS in New York State 3 years ago has been completed, with some staggering findings. The published report indicates that the state is losing soil at the rate of 45 million tons a year: almost 40 tons a minute, more than half a ton a second. Construction sites have the highest rate of sheet erosion loss, losing more than 30 tons of soil per acre annually.

Soil surveys

Arkansas

Crittenden County. By James L. Gray and Dick V. Ferguson. 1974. Soil Conservation Service in cooperation with Arkansas Agricultural Experiment Station. 49 pp., illus.; maps.

California

Eastern Santa Clara Area. By Wesley C. Lindsey. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 90 pp., illus.; maps.

Mariposa County Area. By Charles S. Butler and Griffith S. Jones. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 68 pp., illus.; maps.

Palo Verde Area. By Noram E. Elam. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 37 pp., illus.; maps.

Shasta County Area. By T. A. Klaseen and D. K. Ellison. 1974. Soil Conservation Service and Forest Service in cooperation with University of California Agricultural Experiment Station. 160 pp., illus.; maps.

Indiana

Clark and Floyd Counties. By Allan K. Nickell. 1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 100 pp., illus.; maps.

Meetings

Maryland

Garrett County. By Kenneth M. Stone and Earle D. Matthews. 1974. Soil Conservation Service in cooperation with Maryland Agricultural Experiment Station. 83 pp., illus.; maps.

Oklahoma

Tillman County. By Otho W. Lamar and Clifford E. Rhodes. 1974. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 64 pp., illus.; maps.

South Carolina

Florence and Sumter Counties. By J. J. Pitts. 1974. Soil Conservation Service in cooperation with South Carolina Agricultural Experiment Station. 111 pp., illus.; maps.

Texas

Coke County. By Lloyd J. Barnhill. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 49 pp., illus.; maps.

Hale County. By Earl R. Blakely and William M. Koos. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 54 pp., illus.; maps.

Wisconsin

Brown County. By Ernest G. Link, Charles F. Leonard, Howard E. Lorenz, Wayne D. Barndt, and Steven L. Elmer. 1974. Soil Conservation Service in cooperation with Wisconsin Agricultural Experiment station. 119 pp., illus.; maps.

January

19–22 *National Wool Growers Association and Lamb Feeders Association Joint Convention, San Antonio, Tex.*

27–31 *American Association for the Advancement of Science, New York, N.Y.*

28–30 *American National Cattlemen's Association, Las Vegas, Nev.*

February

2–6 *National Association of Conservation Districts Convention, Denver, Colo.*

6–8 *American Camping Association, New England Convention, Boston, Mass.*

6–8 *Catfish Farmers of America Convention, Little Rock, Ark.*

9–14 *Society For Range Management, Mexico City, Mexico*

10–14 *Annual Eastern Snow Conference, Manchester, N.H.*

19–22 *American Camping Association Mid-Atlantic/Southern Regions Convention, Washington, D.C.*

21–24 *American Association of School Administrators, Dallas, Tex.*

23–26 *Land Improvement Contractors of America, San Antonio, Tex.*

23–26 *Sprinkler Irrigation Association Technical Conference, Atlanta, Ga.*

25–26 *American Forest Institute, Atlanta, Ga.*

28–Mar. 6 *Associated General Contractors Convention, Honolulu, Hawaii*

March

5–8 *American Camping Association Mid-American Region Convention, Milwaukee, Wisc.*

9–14 *American Society of Photogrammetry, Washington, D.C.*

14–16 *National Wildlife Federation, Denver, Colo.*

15–19 *Association for Supervision and Curriculum Development, New Orleans, La.*

16–20 *American Concrete Pipe Association, Boca Raton, Fla.*

24–28 *Seventh Recreation Management Institute, College Station, Tex.*

April

2–4 *Thirteenth Annual Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho*

6–11 *American Chemical Society, Philadelphia, Pa.*

9–12 *American Camping Association Western Region Convention, Pacific Grove, Calif.*

13–16 *National Water Safety Congress, Milwaukee, Wisc.*

17–22 *National Audubon Society, New Orleans, La.*

20–23 *Association of American Geographers, Milwaukee, Wisc.*

21–24 *International Symposium on Livestock Wastes, Urbana- Champaign, Ill.*

21–25 *American Geophysical Union, Washington, D.C.*

21–25 *Annual Western Snow Conference, San Diego, Calif.*

27–May 1 *Garden Club of America, Washington, D.C.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

1.6
035
Reserve.

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / January 1975



U.S. DEPT. OF AGRICULTURE

From the Administrator

Exchanging Viewpoints

Not long ago, an editorial in the quarterly publication of the Minnesota Ornithologists Union was called to our attention. It began:

"I came away from our annual county tour of conservation practices installed under the technical supervision of the Soil and Water Conservation District convinced that some of the current agricultural programs are a boon to the birds."

President Bill Bryson then described much of what he had seen in the Freeborn Soil and Water Conservation District tour—fish ponds, permanent grass cover on steep hillsides and stream banks, an aggressive tree planting program.

He added that planning, design, and supervision of installation of these practices by Department of Natural Resources and SWCD personnel "insure long-term benefits to both wildlife and the human environment."

His comments underline something very important to the Service: face-to-face relationships with a lot more kinds of people and groups.

The more we understand the physical and social processes involved in environmental improvement and the more people we reach and listen to, the closer we will get to understanding what the public interest is in a given situation.

A world of difference exists between imagining what agency personnel, organizational leaders, businessmen, and university staffs think about soil and water conservation and getting their views firsthand.

We're bound to hear unfavorable views. But a little education on both sides can help. The world changes so fast that one couldn't stay wrong or right all the time, even if he tried. We can't avoid criticism, even by saying nothing, doing nothing, and being nothing.

We need to know people and environmental situations individually. That can help make sure any criticism is specific and based on facts or honest opinions.

That kind of criticism is most helpful in improving conservation programs.

Favorable views, such as those of Bill Bryson, are helpful too—and much appreciated.

Kenneth E. Grant

SOIL conservation

January 1975, Vol. 40, No. 6

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

Contents

2 From the Administrator

4 'Come to the Farmers Market'
Frank Jeter, Jr.

6 Working Together for Water
Moses Taylor

7 Just About Everyone Chips In At Louisiana School Garden
Gene Warren

8 Stopping the Sea
Charles E. Mowry and Fred B. Givens, Jr.

10 Field Brome—Cover Crop That Copes
W. H. Billings

11 Nation's First RC&D Project Marks Its 10th Year
Charles E. Gentry

13 Highlights—1974

17 Minnesota's First Conservation District—And Its Founding Father
Thomas C. Gahm

20 Jupiter Pluvius Checked in Kansas
Fred Trump

22 Soil Surveys

23 Meetings

COVER: Snow-blanketed mountains and a streamlet in Idaho depict the beauty of winter and its promise: the melting snow flowing here will aid the farmer in irrigation come summer.

'Come to the Farmers Market'

by Frank Jeter, Jr.
Information officer, SCS, Raleigh, North Carolina

The wooden sign says: "Come to the Farmers Market." And hundreds of people in mountainous Watauga County, North Carolina, do just that. If you should drop in some Tuesday, Thursday, or Saturday, you would see a community market with all the charm of small-town living.



George Hamilton, market manager, chats with two small shoppers.

The Watauga County Farmers Market opened in Boone last July and is still spartan in appearance. Most merchandise is displayed on wooden planks on cinder blocks or on the backs of trucks or station wagons. But the merchandise is what attracts both local and out-of-state customers.

Wild and cultivated flowers, homegrown vegetables for which the mountain country of North Carolina is famous, and handicrafts fill the stands.

You can buy apples from local orchards and sweet apple cider. You can buy Indian corn and sweet corn, Irish potatoes and sweet potatoes, rutabagas and turnips. And you can buy squash, green beans, beets, collards, peppers, pumpkins, broccoli, and tomatoes.

Handicrafts include knitted items—from scarves to sweaters, jewelry made from wood and from native stone, and homemade candles, pottery, furniture, and lamps.

You can buy fresh ham biscuits, made with real country ham. One enterprising vendor brought a pony and sold pony rides to youngsters for 25 cents.

The market association, a nonprofit organization, has 80 members, who pay $2 to join. They then pay a flat fee of 50 cents a day to sell at the market.

Such a fresh produce market had been a topic of conversation for years in Watauga County as a means of added income, but nothing had ever come of it.

Then, the New River Resource Conservation and Development (RC&D) Project adopted the farmers market as an active measure. Most backers of the market agree that it was this involvement that "made the difference."

RC&D projects, sponsored by the U.S. Department of Agriculture with the Soil Conservation Service as the "lead agency," are to provide a framework for local people to see a need, establish a program, and then work to carry it out.

With 2,400 part-time farmers in Watauga County, and most of these operators of small tracts, a farmers market soon had wide community support.

George Hamilton, in many ways the guiding spirit of the market, helped get it organized and serves as president and general manager of the nonprofit venture.

The county commissioners showed their support with $1,500 in "seed money." "WAMY," a Community Action



Harmonica music adds to the fun at the Watauga County Farmers Market.

Program in a 4-county area that included Watauga County, agreed to pay the salary for a manager for the market. WAMY gets its name from the initials of the four counties it serves.

By summer, the market opened on a half-acre vacant lot in the Boone Docks Plaza on the outskirts of Boone, named for the famed frontiersman, Daniel Boone.

North Carolina Governor James E. Holshouser, Jr., a lawyer in Boone, came to the formal dedication on July 6, 1974.

A local newspaper gave extensive coverage to the market, public service announcements were given on the radio, and the Farm Bureau mentioned it on several broadcasts.

While the main promotion for the new enterprise was originally word of mouth, the market has been able to do more newspaper and radio advertising as money has become available.

Other assists have come from the Northwestern Bank, which helped finance advertising, and from the Blue Ridge Electric Membership Corporation, which helped draw sellers to the market by sending out questionnaires to 9,000 people.

"Everybody wanted it," summed up one enthusiastic member of the market association.

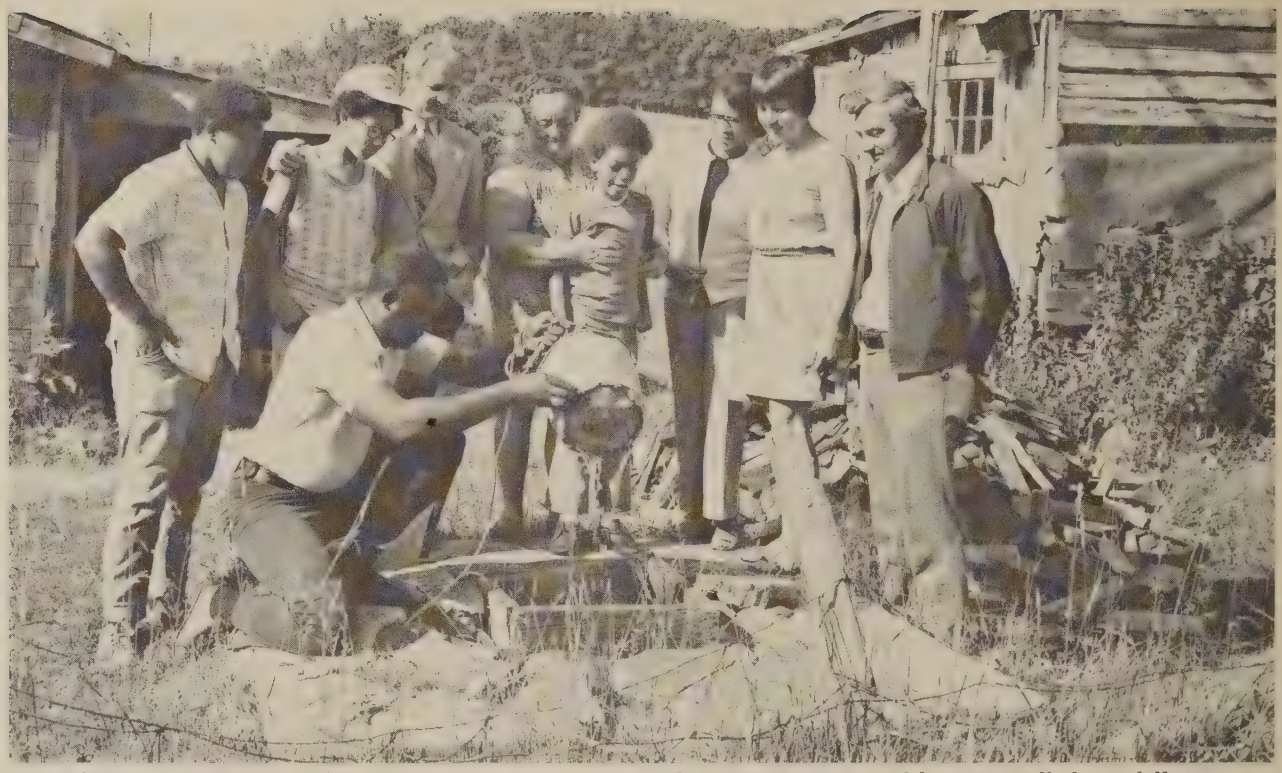
On a typical day, 20 to 30 sellers are at the market. Most are from the immediate area, but some come from as far away as Tennessee and South Carolina.

One of the sellers is 15-year-old Evelyn Hayes. Still in school, she's found the market offers quite an opportunity. She and her mother live on a farm near Boone and sell flowers and fresh garden produce at the market.

She netted $750 in sales in 3 months and is planning to build a frame-and-plastic greenhouse to lengthen the selling season.

In addition to providing extra income, perhaps for higher education, the market has offered her other opportunities.

"It's where country people can meet city people and get to know them. This is really the enjoyable part," she said. ♦



Now that the community of Entry Mountain is in the Franklin water system, old water wells have fallen into disuse—and buckets leak—as demonstrated by author.

Working Together for Water

by Moses Taylor
District conservationist, SCS, Franklin, West Virginia

Entry Mountain is an isolated rural community of 38 families in the heart of Appalachia in eastern West Virginia.

The people there have limited means. There was a time when most of the families were somewhat destitute. Time has changed the situation some.

In the early days, most of the residents of Entry Mountain made their living by farming and by working for people in nearby Franklin. With increased mechanization of farming and increased use of modern conveniences, employment opportunities decreased. Many of the young people began to leave the community to find work elsewhere.

In 1968, the Hanover Shoe Factory moved into the area, and things started changing. Many of the young people started working for the shoe factory. While their personal incomes improved, their community needed many improvements.

The most urgent need was an adequate and safe water supply. Old wells were polluted and sometimes went dry, and some families had to have water hauled to storage tanks.

In 1969, VISTA volunteers started working with community residents to solve some of these problems. They made the water supply their first project. A community association was formed. With a $3,000 grant from VISTA, Entry Mountain was launched in its effort to obtain an adequate water supply—a goal that required $200,000.

The Entry Mountain Community Association raised $18,000 through basketball games, socials, 4-H Club activities, rummage sales, sales of candy and soft drinks, and donations from individuals.

A Miracle Day fund raising drive in Franklin (population

695) raised $9,000 in July 1972. Altogether, the town of Franklin and other neighbors raised $22,000.

Entry Mountain used technical assistance where it was available. One source was the county rural development council sponsored by the U.S. Department of Agriculture. Made up of federal and state agency personnel, it was known as the Technical Action Panel in 1969 and is now the Mountaineers for Rural Progress, or MRP.

The MRP and a local agency member, the Potomac Valley Soil Conservation District, helped with the community's public information program. The Soil Conservation Service, a federal agency member, provided soils information and some engineering work. Finally, the U.S. Economic Development Administration contributed a grant of $160,000, and Entry Mountain could begin construction for its water supply.

The project involved construction of two 50,000-gallon reservoirs northwest and southwest of Franklin, two pumping stations, and 15,725 feet of pipeline. The town extended its water system not only to Entry Mountain, but also to two other areas, including a proposed housing development.

Campaigning for Human Development, a Catholic Church organization based in Richmond, Virginia, contributed $4,200 to pay for hookups for Entry Mountain for the new water system and for septic tank sewage disposal systems for the community center and church.

"The water project is now serving the 38 families in the Entry Mountain community and 19 other new users in surrounding areas," according to Elmer Hartman, mayor of Franklin.

"The water was turned on on November 14, 1973. It was a happy day, especially for residents of Entry Mountain, where springs and wells had been condemned and one home had been destroyed by fire because of lack of water," Mayor Hartman said.

Since the approval of the water project, three residents have constructed new homes in Entry Mountain and a fourth home is under construction. Two new mobile homes have been moved to permanent sites in the community.

"Two more houses are being renovated, and I am sure there will be more improvements to the community as a result of this water project," said Mrs. Lottie Wright, president of the Entry Mountain Community Association.

Construction has also begun in the proposed housing development to be served by the new water system.

"Franklin has already benefited from the water supply project for Entry Mountain," Mayor Hartman said, "because Franklin was badly in need of new housing units."

"Today we have an abundance of treated water from the town of Franklin system," Mrs. Wright noted. "This project is an excellent example of people banding together to get a job done." ♦

'Just About Everyone Chips In' At Louisiana School Garden

The children at Third Street School in DeRidder, Louisiana, can't wait to dig in their garden each day.

About 50 young people are enrolled in Third Street, a special school for students who need more attention than they might get in a regular school.

"The students get a boxed-feeling sitting indoors all day, but when they come to work in the garden, their attitude changes right away," commented LeNoah Bettis, the prime promoter of the garden project, and the head of the school's science and technology program.

Across the street from the school at DeRidder is the SCS district office, and Max Baer, district conservationist, has helped with the garden project since it began in 1972. He shows the students how to prepare the soil and how to prevent erosion and suggests things to plant.

"Just about everybody chips in," Bettis said. "Most of the heavy work is done by older students, but the 6- and 7-year-olds help, too. They think it's fun to plant seeds, pull weeds, and especially to pick corn, tomatoes, and other crops.

"The main educational goal of the garden project is to involve the students so they will develop a better appreciation of living things and learn the skills needed in planting and growing food plants. In many cases, working in the garden is the first real learning experience some students have had," Bettis said.

"It makes me feel good when they go home and start gardens of their own."—GENE WARREN, *information specialist, SCS, Alexandria, Louisiana.*



Stopping the Sea

by Charles E. Mowry and
Fred B. Givens, Jr.
Plant materials specialist, SCS, Boise, Idaho, and civil engineer, SCS, Warsaw, Virginia

An old sailor's saying has it that "The sea goes where the sea wants to go, and no man can stop it." Men have tried to stem the tides for centuries, sometimes with the success of the Dutch, and sometimes with all the failure of King Canute.

Few people are as interested in stopping the sea as private and public landowners holding shore frontage in Virginia due to the alarming rate of shore erosion in many areas.

The fluctuating tides, wave action, freezing, thawing, and floating ice pose a constant threat to this valuable strip of shore frontage. In the last 17 years, however, many owners of homes have successfully turned to the Soil Conservation Service to obtain the technical advice they needed to stop the sea and protect their land.

The first SCS involvement in shore stabilization was in 1957 at the request of the Northern Neck Soil and Water Conservation District of Virginia. As a result of this request SCS specialists designed a bulkhead wall and a series of groins to protect the home of John Dos Passos from the fluctuating waters of the Potomac River.

A vertical bank approximately 15 feet high and 300 feet long, fronting the famous author's property, was washing away. A treated timber bulkhead was built 10 feet from the vertical bank. Following bulkhead construction, the backfill and bank were graded to a 5:1 slope. Three treated timber groins, each 75 feet long

Timber groins and a bulkhead wall in the Northern Neck Soil and Water Conservation District in Virginia help control tidal erosion on the Potomac River.

and 120 feet apart, were constructed at right angles to the bulkhead. The upper part of the graded slope was seeded to a lawn mixture and the lower part was sprigged to Midland bermudagrass.

As soon as the groins were sufficiently filled with littoral drift (water deposited sand), the zone between normal high tide and the bulkhead was planted with vegetative divisions of marshhay cordgrass (*Spartina patens*) and American beachgrass (*Ammophila breviligulata*). These grasses produced a dense mat of roots that held the deposited sand in place. The surface vegetation trapped windblown sand particles, and soon had trapped enough sand to completely cover the bulkhead. The structure has withstood 17 years of tidal fluctuation and is still holding the line.

In 1965 SCS developed a practice standard for shore protection. This standard was developed cooperatively with the U.S. Army Corps of Engineers and reflected SCS's experiences in early installations. With this practice standard as the base, technical assistance has been made available to many other landowners.

Technical assistance consists of a study of each individual shore erosion problem, a plan for correcting or slowing the erosion, working drawings of needed structures, and details of vegetative systems.

There is no doubt that vegetation has been much more effective when used in conjunction with structures than either vegetation or structures alone. However, under certain conditions, smooth cordgrass (*Spartina alterniflora*) has stabilized the shore of smaller tidal streams where the wave action is not too intense. This grass grows just above and below mean high tide elevations. Smooth cordgrass must be planted with vegetative root stock and has just recently become available from commercial producers.

National policy for SCS technical assistance for shore protection is restricted. To be eligible for assistance, the following conditions must be met:

(1) The problem can be solved with vegetation, normal upland erosion control practices, or relatively simple and inexpensive structures such as riprap revetments or rock or timber groins less than 3 feet high.

(2) Failure of structural measures from high intensity storms will not create an immediate hazard to life or result in serious damage to buildings, residences, roads, or other high value property.

(3) Installation of the recommended measures will not have significant adverse effects on the environment or on adjacent lands, waters, or installations.

(4) Sponsors and cooperators thoroughly understand the level of protection being provided and their responsibilities for maintenance and repair.

In the years since SCS worked on protecting the Dos Passos shoreline, the agency's involvement with seaside landowners has increased. In 1973, SCS in Virginia serviced 350 requests for assistance, including shoreline erosion control on Silver Beach, the town of Cape Charles on Virginia's Eastern Shore, and sand dune stabilization for the City of Hampton. ♦



A good protective cover in northwest Oregon, field brome is used with such intensively farmed crops as nursery stock.

Field Brome—Cover Crop That Copes

by W. H. Billings
Plant materials specialist, SCS, Portland, Oregon

"In this small county, the land taken up by the city of Portland and Mount Hood National Forest . . . does not leave much for agriculture."

That statement, in the 1922 soil survey of Multnomah County, Oregon, still applies today. Continued urban growth and competition for land mean that agricultural crops must have a high value to compete successfully with other demands for the land.

That's why much of the farming is in intensive row crops—vegetables, caneberries, nursery stock, and strawberries.

This intensive farming—frequent cultivation, annual cropping, chemical weed control—and high winter rainfall in the area create severe erosion problems.

Working through the East Multnomah Soil and Water Conservation District, farmers around Gresham have sought a good annual cover crop to meet their highly specialized production needs.

In 1971, upon the recommendation of District Conservationist Don Brackett, three farmers made trial plantings of field brome as a cover crop to protect the soil during the wet winter months.

The district requested enough seed to get the program started from the Corvallis Plant Materials Center of the Soil Conservation Service.

These first trials—in nursery stock, cauliflower, and strawberry fields—proved successful and created strong demand for field plantings during the fall of 1972.

Now in its third year, the practice of planting field brome for a winter crop has prompted the Gresham Co-op Seed Store to stock field brome to meet the needs of local farmers.

Field brome now appears well on its way to becoming the standard cover crop in the area east of Portland. It is short, develops an extensive root system, matures its seed late, works under easily, and is not weedy.

Other initial field plantings had included 'Blando' brome and 'Cucamonga' brome, both of which produce more top growth than field brome and provide good winter cover. However, trials have been discontinued for these plants after 'Cucamonga' brome proved susceptible to freeze damage and 'Blando' brome seed matured a month earlier than field brome. ♦



A fish pond demonstration draws a crowd along the shore in southern Indiana. Sponsored by the Fish and Wildlife Committee of the Lincoln Hills RC&D Project, the demonstration showed pond management for fish production and recreation.

Nation's First RC&D Project Marks Its 10th Year

by Charles E. Gentry
Project coordinator, Lincoln Hills RC&D Project, SCS, Cannelton, Indiana

When we think of Abraham Lincoln, Kentucky comes to mind as his birthplace and Illinois as his home. We often overlook the fact that Abe spent his youthful years in southern Indiana. It was in Indiana that the 16th President learned to read, to write, to split rails, and to poll ferries across the river.

In southern Indiana, Lincoln has given his name to such places as Lincoln City, Lincoln State Park, and Lincoln Boyhood Memorial.

In 1964, he gave his name to the nation's first Resource Conservation and Development Project—the Lincoln Hills RC&D Project. The project area includes the counties of Crawford, Harrison, Perry, and Spencer.

Although the Lincoln Hills project began only 11 years ago, Lincoln spoke the words that most nearly describe the RC&D project concept on November 19, 1863, during his famous Gettysburg Address. He spoke of a government "of the people, by the people, and for the people."

The Lincoln Hills RC&D Project really works because it is "of the people, by the people, and for the people."

Since it was launched, the Lincoln Hills RC&D Project has completed 208 action measures and has helped to plant 8 million trees, build 5 lakes, and establish 14 rural waterlines. The area's average educational level has risen from 8.7 to 10.2 years, and the average family

income has risen from $3,977 to $7,727.

Yet, only $148,000 in federal cost-sharing funds have been spent on all the completed RC&D measures in Lincoln Hills. There is no denying that federal funds have helped, but many worthwhile projects have been accomplished solely through the efforts and cooperation of local people and local organizations.

Special RC&D committees were formed to develop the potential for solving various resource problems within the project area.

For instance, the Fish and Wildlife Committee worked with conservation clubs and landowners to develop a 9-square-mile area as wildlife habitat. Caged catfish production has been sponsored and promoted by the committee to the point that people turn out by the hundreds to dine on the delicious fish. Local residents are now growing and selling catfish for profit.

Through demonstrations, the Forestry Committee has been responsible for modernizing logging equipment used in the area. Committee members also encouraged paper mills and sawmill operators to chip and market waste wood—work that returns $850,000 to the area annually.

Through special schools, news articles, and personal contacts with farmers, the Livestock-Forage Committee has helped increase the quality of livestock and forage in the area. At a recent livestock forage training course sponsored by the committee, 100 farmers met one evening a week for 5 weeks to study methods for improving the quantity and quality of forage and livestock on their farms. A local bank purchased bulls to lease to farmers to increase the quality of beef produced in the area.

The Arts and Crafts Committee now has some 250 people producing items for sale, including paintings, wood workings, floral decorations, and glass. These items are sold at arts and crafts shows, craft shops, and restaurants in the area.

And so goes it with the Human Resources Committee, the Tourism Committee, and the RC&D Executive Committee.

Problems and potentials are recognized and discussed, alternatives considered, and a plan of action developed. The committee then goes to work.

For instance, Indiana Vocational Technical College has developed an adult education program with the help of the RC&D project's Human Resources Committee and the Extension Service, working through vocational advisory committees. Courses based upon the needs of industry in the Lincoln Hills area—typing, accounting, basic electricity, blueprint reading, communications skills, and fundamentals of math and welding—are currently being taught to nearly 300 adults. ♦



A lumber grading short course, sponsored by the Forestry Committee, was aimed for employees in the lumber industry in the RC&D area.

Highlights—1974

Summary of activities of the Soil Conservation Service for fiscal year 1974

The Soil Conservation Service in fiscal year 1974 continued its 40-year program of technical assistance in soil and water management to America's land users through 2,995 local conservation districts.

SCS technicians helped prepare more than 62,000 conservation plans covering 25 million acres and helped revise more than 28,000 plans covering 18.7 million acres. More than 610 million acres of nonfederal land in the United States are now covered by conservation plans that help insure adequate resource protection and more rational land use.

Conservation districts on June 30, 1974, had 2.3 million voluntary cooperators who were applying and maintaining soil and water conservation practices on 791 million acres.

SCS technicans also provided onsite assistance to farmers, ranchers, and others to make sure that conservation measures were properly planned, installed, and maintained. In fiscal year 1974, SCS provided 2.5 million technical services to more than one million individual land owners and users. The agency also helped more than 14,500 groups of land users with conservation plans and related services.

During the year, SCS helped individuals and groups to install 2.7 million acres of contour farming; 12,445 miles of terraces, and 449,707 acres of stripcropping; and 171,839 acres of vegetative cover on critical areas. These individual practices generally were part of complex management systems installed on farms, ranches, and other public and private lands.

One of the fastest growing conservation practices was minimum tillage, including no-till farming, which was tried on an additional 2.5 million acres, for a cumulative total of 32.6 million acres.

Conservation help for units of government

In response to growing demands, SCS employees furnished nearly 135,000 services to more than 32,000 local and state governments and their agencies. A total of 565 local ordinances concerned with land use and erosion and sediment control were passed by local governments. Basic soil and water data for drafting these rules were supplied by the Service. Some 18,000 natural resource inventories and evaluations were prepared with SCS help. With these, local governments, with SCS help, can develop quality standards for conservation land use and treatment.

A total of 42 states on June 30, 1974, had either held or were planning to hold erosion and sediment control institutes. These provide state leadership with a base on which to develop sediment control legislation. To date, 10 states and the Virgin Islands have enacted such laws, and one more, Louisiana, assigned sediment control responsibilities to local districts on orders of the Governor. Twenty-three other states have introduced legislation. SCS provided resource facts to help formulate these laws and proposals.

Woodlands and windbreaks

Under guidance of SCS technicians, landowners prepared

192,000 acres of woodland sites and improved 268,000 acres of woodland. Improved harvesting of timber was adopted on 1.2 million acres, bringing the cumulative total to 33.4 million acres.

SCS field people also helped farmers and ranchers plant 2,577 miles of field windbreaks, raising the total mileage of windbreaks planted by district cooperators since the program began to 99,000 miles. A total of nearly 46,000 acres was planted in farmstead and feedlot windbreaks, bringing the cumulative total to more than 808,000 acres.

Pasture and range conservation

SCS field people helped farmers and ranchers with pasture and hayland plantings on nearly 2.5 million acres during fiscal year 1974, bringing the cumulative total of improved pasture acreage to about 75 million acres. Pasture and hayland management systems were applied to 10.7 million acres.

In the West, SCS technicians helped ranchers reseed 352,000 acres of rangeland, bringing total range reseeded since the program began to nearly 17 million acres.

Wildlife and recreation

Service specialists helped land owners improve 10.1 million acres of land and water for the specific benefit of wildlife during the year–a 5 percent increase over fiscal year 1973. They helped farmers install other measures which benefit wildlife, including 23,500 ponds. SCS also helped land users with recreation developments, both for profit and for noncommercial use.

Great Plains conservation program

During fiscal year 1974, some 2,600 farmers and ranchers signed contracts under the Great Plains conservation program to apply permanent conservation measures on 4.2 million acres. A total of 47,700 farmers and ranchers have signed long-term contracts covering 86 million acres since the program began in 1956. The program is carried on in 469 counties in 10 states.

Resource conservation and development projects

Resource conservation and development projects are multicounty organizations which aim at accelerated town-and-country economic development through a variety of approaches, including better resource use and management.

Twenty-five new RC&D projects, located in 24 states, were added during fiscal year 1974. This brought the total number of RC&D projects in the nation to 148, covering more than 616 million acres. Of these projects, 39 had been approved for planning as of June 30, 1974, and 109 had been authorized for operations. On the same date, there were 64 RC&D applications on hand, covering more than 281 million acres.

Watershed projects

Small watershed projects under Public Law 566, enacted in 1954, combine conservation measures on private and public land with dams and other structural measures to reduce floods and provide water supply, recreation, and wildlife habitat. During fiscal year 1974, a total of 26 watershed projects were completed, bringing the total of P.L. 566 projects completed since the program began to 379.

Ten projects were authorized for planning for a total of 1,686; and 18 were approved for construction, bringing the cumulative total to 1,096. Construction starts were made during 1974 on 33 projects.

Nine more river basin studies were completed during the year, bringing total completions to 67. An additional 65 studies were still in progress. SCS also handled 12 flood hazard analyses and made 525 flood insurance studies, including 11 detailed studies.

Soil surveys

The Service leads the national cooperative soil survey, whose objective is to make and publish soil surveys of all areas of the United States, Puerto Rico, and the Virgin Islands. In fiscal year 1974, detailed soil survey mapping was completed on an additional 37.7 million acres; reconnaissance soil survey mapping was done on 9.1 million acres. As of June 30, 1974, a cumulative total of 901 million acres had been mapped under the cooperative federal-state program. Eighty new soil surveys were published during the fiscal year; 85 more survey manuscripts were sent to the printer.

Snow surveys

In the West, SCS snow surveyors measure the water content of the mountain snowpack in winter to estimate how much water will be available in the spring and summer. In fiscal year 1974, snow surveyors took 6,434 separate snow course measurements and issued 2,763 water supply forecasts. ♦

Summary of Progress, Fiscal Year 1974

Reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

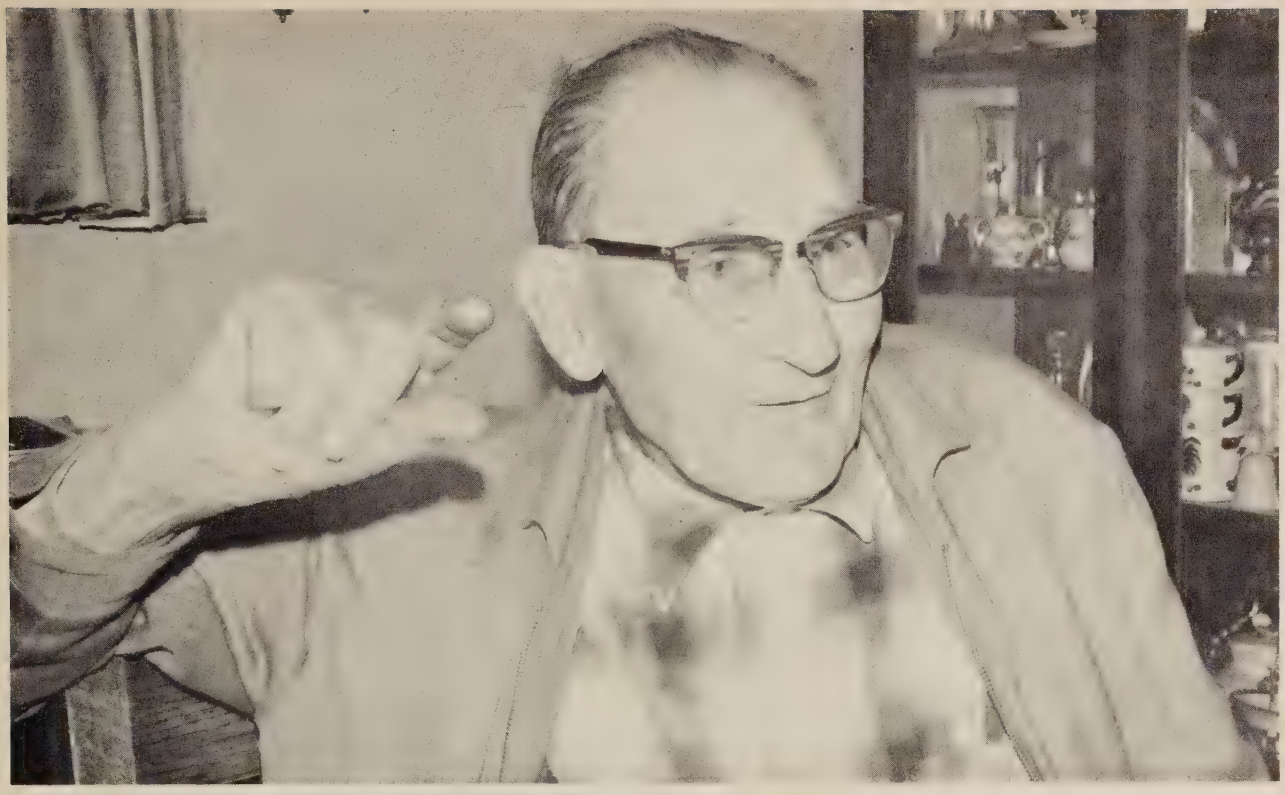
Progress item		Fiscal year 1974	Cumulative to June 30, 1974
Conservation plans and related services			
District cooperators	No.	85,328	2,304,042
District cooperators	acres	32,558,779	790,749,553
Land users assisted	No.	1,054,011	—
Services to land users	No.	2,509,710	—
Land users applying practices	No.	548,441	—
Conservation plans prepared	No.	62,161	1,813,001
Conservation plans prepared	acres	24,968,628	610,704,605
Conservation plans revised	No.	28,333	—
Conservation plans revised	acres	18,732,202	—
Inventories and evaluations prepared	No.	86,230	—
Federal lands under coordinated conservation plans	No.	99	1,345
Federal lands under coordinated conservation plans	acres	635,195	15,091,539
Resources planning and implementation for units of government and their agencies			
Units assisted	No.	32,208	—
Technical services	No.	134,853	—
Land use and treatment data provided	No.	15,120	—
Resource plans	No.	1,178	—
Inventories and evaluations	No.	18,320	—
Land use regulations using soil and water data	No.	565	—
Sites for public facility, selected	No.	1,758	—
Sites for public facility, investigated	No.	13,629	—
Long-term Rural Environmental Conservation Program			
Long-term agreements serviced	No.	4,403	—
Conservation plans for long-term RECP agreement	No.	416	416
Conservation plans for long-term RECP agreement	acres	99,188	99,188
Long-term RECP agreements expired or terminated	No.	3	3
Long-term RECP agreements expired or terminated	acres	1,235	1,235
Group conservation plans and related services			
Groups assisted	No.	14,569	—
Conservation plans prepared	No.	2,604	23,382
Inventories and evaluations	No.	4,312	—
Technical services	No.	68,471	—
Groups applying practices	No.	3,511	—
Soil surveys			
Detailed soil surveys	acres	37,650,500	839,334,727
Reconnaissance soil surveys	acres	9,081,777	61,667,979
Total surveys	acres	46,732,277	901,002,706
Exploratory soil surveys in Alaska	acres	16,546,240	354,062,240
Soil surveys published	No.	80	—
Snow surveys			
Snow course measurements	No.	6,434	—
Aerial snow marker course readings	No.	768	—
Mountain precipitation gauge readings	No.	1,778	—
Soil moisture station readings	No.	1,019	—
River stations for which numerical forecasts issued	No.	942	—
Water supply forecasts issued	No.	2,763	—

Progress item		Fiscal year 1974	Cumulative to June 30, 1974
Great Plains contracts			
Applications received	No.	2,502	53,744
Applications received	acres	4,893,099	101,639,129
Contracts signed	No.	2,599	47,739
Contracts signed	acres	4,200,049	86,190,485
Contracts terminated	No.	2,647	31,542
Contracts terminated	acres	4,578,160	53,494,857
Cropland before GP contract	acres	711,090	13,257,720
Planned cropland conversions	acres	145,464	2,798,786
Servicing other USDA programs			
Referrals serviced:			
REAP-fiscal year	No.	89,872	—
REAP-18-month program year	No.	—	60,363
Cropland Adjustment Program	No.	5	—
Appalachian Program	No.	398	—
Conservation plans approved	No.	45	—
Water Bank Program			
Referrals serviced	No.	1,247	—
Plans developed	No.	273	1,457
Plans developed	acres	110,936	753,725
Wetland treatment completed	acres	23,273	—
Recreation development			
Land owners and operators:			
Establishing first commercial enterprise	No.	1,210	71,426
Expanding or adding to recreation enterprises for primarily commercial use	No.	901	—
Changing to recreation enterprises as primary source of income	No.	73	12,882
Changing to recreation enterprises as primary source of income	acres	114,296	2,586,649
Establishing, expanding, or adding to recreation developments for primarily noncommercial use	No.	24,421	696,042
Establishing, expanding, or adding to public recreation developments	No.	518	50,115
River basin studies			
Flood hazard analyses	No.	12	—
Flood insurance studies, including detailed studies	No.	525	—
River basin studies in progress	No.	65	—
River basin studies completed	No.	9	67
Watershed projects			
Applications	No.	32	2,902
Authorized for planning	No.	10	1,686
Approved for construction	No.	18	1,096
Construction starts	No.	33	876
Projects completed	No.	26	379
RC&D projects			
Applications on hand	No.	—	64
	acres	—	281,440,000
Project areas authorized for assistance	No.	—	148
	acres	—	616,742,000
Project areas in planning	No.	—	39
	acres	—	140,186,000
Projects authorized for operation	No.	—	109
	acres	—	476,556,000
RC&D measures completed	No.	1,303	7,274

Reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress item		Fiscal year 1974	
Watershed and RC&D project measures		Watershed	RC&D
Reservoir-type structure sites:			
Investigated	No.	261	154
Surveyed	No.	537	130
Reservoir-type structures:			
Designed	No.	678	121
Under construction	No.	1,127	127
Flow control structure sites:			
Investigated	miles	240	93
Surveyed	miles	307	100
Flow control structures:			
Designed	miles	278	43
Under construction	miles	1,124	155
Fish, wildlife, and recreation developments (public):			
Surveyed	No.	5	25
Designed	No.	2	8
Under construction	No.	19	15
Services provided on land rights, agreements, and contract awards	No.	18,495	2,599

Practice		Fiscal year 1974	On the land—June 30, 1974
Agricultural waste management systems	No.	967	2,228
Bedding	acres	15,349	828,476
Brush management	acres	3,891,159	59,260,033
Burning, prescribed	acres	398,645	5,330,140
Chiseling and subsoiling	acres	731,491	10,859,428
Clearing and snagging	miles	862	8,767
Conservation cropping system	acres	18,923,240	217,630,533
Contour farming	acres	2,653,372	50,178,630
Critical area planting	acres	171,839	5,316,860
Crop residue management	acres	17,585,186	181,533,155
Dams, diversion	No.	395	23,596
Dams, multiple-purpose	No.	147	7,834
Dams, multiple-purpose	acre-feet	51,076	21,325,599
Debris basin	No.	1,532	81,729
Deferred grazing	acres	12,088,726	96,284,133
Dike	miles	292	13,154
Disposal lagoon	No.	636	6,793
Diversion	miles	1,303	104,206
Drainage field ditch	miles	4,021	201,395
Drainage land grading	acres	21,731	547,193
Drainage main or lateral	miles	4,719	383,276
Drain, subsurface	miles	20,000	889,858
Farmstead and feedlot windbreak	acres	45,880	808,183
Fencing	miles	4,856	605,730
Field border	miles	850	47,895
Field windbreak	miles	2,577	99,031
Firebreak	miles	3,680	43,674
Fishpond management	No.	56,834	738,562
Fish ponds, commercial	acres	3,886	70,989
Fish raceways	feet	27,386	451,783
Fish stream improvements	feet	224,832	2,968,417
Flood water diversions	feet	36,814	1,728,700
Floodwater retarding structures	No.	360	11,912
Floodwater retarding structures	acre-feet	226,142	6,265,395
Floodways	feet	66,926	4,873,769
Grade stabilization structures	No.	7,718	242,351
Grassed waterways or outlets	acres	50,097	2,135,679
Grazing land, mechanical treatment	acres	13,550	1,462,976
Heavy use area protection	acres	2,011	175,449
Hedgerow planting	miles	472	24,434
Hillside ditch	miles	41	2,994
Holding ponds and tanks	No.	1,111	8,626
Irrigation canal or lateral	miles	209	58,213
Irrigation ditch and canal lining	miles	609	35,782
Irrigation field ditch	miles	1,202	132,449
Irrigation land leveling	acres	194,107	12,399,618
Irrigation pipeline	miles	2,772	104,398
Irrigation pit or regulating reservoir	No.	690	54,618
Irrigation storage reservoir	No.	158	41,202
Irrigation storage reservoir	acre-feet	9,576	8,705,617
Irrigation system, drip	No.	123	418
Irrigation system, drip	acres	4,981	32,966
Irrigation system, sprinkler	No.	4,402	142,481
Irrigation system, sprinkler	acres	422,250	9,676,818
Irrigation system, surface & subsurface	No.	4,090	173,489
Irrigation system, surface & subsurface	acres	452,440	18,384,320
Irrigation system, tailwater recovery	No.	701	18,573
Irrigation water management	acres	3,091,653	22,672,679
Land smoothing	acres	185,678	8,048,284
Livestock exclusion	acres	523,284	16,174,576
Minimum tillage	acres	2,450,736	32,630,025
Mulching	acres	57,819	1,366,330
Open channels	miles	848	16,794
Pasture and hayland management	acres	10,683,094	72,331,141
Pasture and hayland planting	acres	2,487,182	74,960,126
Pipeline for recreation or livestock	miles	1,900	38,468
Planned grazing systems	acres	6,730,041	52,005,493
Ponds	No.	23,500	1,972,493
Proper grazing use	acres	53,332,872	274,705,373
Pumping plant for water control	No.	2,667	125,825
Range seeding	acres	352,149	16,962,731
Recreation area improvement	acres	61,120	1,503,389
Recreation land grading and shaping	acres	17,001	447,100
Recreation trail and walkway	miles	532	15,654
Road, access	miles	2,204	33,083
Spring development	No.	1,942	139,167
Stock trails and walkways	feet	83,685	23,190,380
Stream channel stabilization	miles	96	1,235
Streambank protection	miles	1,072	10,512
Stripcropping	acres	449,707	22,786,182
Structure for water control	No.	30,507	2,120,516
Terrace, basin	miles	169	2,698
Terrace, gradient	miles	4,734	723,935
Terrace, level	miles	3,440	443,934
Terrace, parallel	miles	4,102	86,572
Total terraces	miles	12,445	1,257,139
Toxic salt reduction	acres	42,390	1,663,321
Tree planting	acres	373,661	21,750,657
Troughs or tanks for livestock	No.	6,575	575,425
Waterspreading	acres	31,334	1,231,410
Wells	No.	7,483	623,210
Wildlife wetland habitat management	acres	511,186	6,390,736
Wildlife upland habitat management	acres	9,549,991	65,019,505
Wildlife watering facility	No.	1,157	33,587
Woodland, direct seeding	acres	10,850	798,650
Woodland, improved harvesting	acres	1,154,241	33,445,978
Woodland improvement	acres	267,708	16,806,129
Woodland pruning	acres	9,844	258,127
Woodland site preparation	acres	191,523	5,305,459
Land treated			
Land protected during development	No.	1,212	10,531
Land protected during development	acres	35,773	323,239
Land adequately treated	acres	27,190,215	—



Clint Dabelstein talks about conservation activities in the early days of the Burns-Homer-Pleasant Soil and Water Conservation District he helped found nearly 40 years ago. (Photograph courtesy of Winona Daily News.)

Minnesota's First Conservation District—And Its Founding Father

by Thomas C. Gahm
Information specialist, SCS, St. Paul, Minnesota

Eighty-two year old Clint Dabelstein has seen the fragile land of Winona County, Minnesota, change from a poorly managed, heavily eroded, and low-yield condition to some of the most beautiful and well-conserved land in the state. He has done more than watch this change take place. Clint Dabelstein made soil conservation happen in Winona County.

Dabelstein was operating two farms on 300 acres in the Pleasant Valley above the Mississippi River when, in the early 1930's, he decided that he and the land had had enough.

"Soil from up on the ridges was washing down and covering the good farmland in the valley," Dabelstein recalled in an interview. "I was sitting in a vulnerable place here in the valley every time the water would drain down. Our particular valley was not the only one. The farther down you were, the worse it got. Down in the City of Winona, basements and streets were flooding all the time."

Not one to sit by and watch good farmland erode into the Mississippi River, Dabelstein launched a personal campaign for soil and water conservation in Winona County. He led the effort to bring a Soil Conservation Service demonstration project into the county because he knew the only way to get people interested in con-

servation was to show them what could be done.

"There was nothing around here you could point to to show farmers what conservation could do," he recalled, "but they figured that a demonstration project couldn't make things any worse than they were."

SCS began the Gilmore Valley Demonstration Project in Winona County in 1935. For 3 years, federal money and manpower went into experimental conservation practices such as tree planting, terracing, and stripcropping. When 3 years had passed, people began to think that maybe there really was something to this soil conservation stuff that Dabelstein had been preaching.

"The Gilmore Valley project and the drought of '34 and '35 began to make things happen," Dabelstein said. "People were really discouraged about the quality of the land around here. There was even talk about abandoning farms and moving elsewhere."

Dabelstein, who was born in Winona County and had been farming there since 1919, was not about to leave. He was "young enough to feel that something should be done about the problem."

An officer in the Farm Bureau, Dabelstein knew most of the people in the area and got around to talk to them. "I showed the Gilmore project to people, but I told them that we couldn't depend on the government to do it all for us. I asked people if we were going to save this land ourselves or if we were going to get out."

In 1937, Dabelstein's efforts paid off with the creation of the Burns-Homer-Pleasant Soil and Water Conservation District—the first conservation district organized in Minnesota. It required a commitment from 90 percent of the landowners in the proposed district and an act of the Minnesota Legislature. The name came from three watersheds which drain into the Mississippi River.

Dabelstein was appointed to the district's first board of supervisors. He's still a district supervisor today, and has been chairman for most of the district's 38 years. He reminisces about life in the original conservation camp as if it were yesterday and recalls vividly the priorities and conservation practices planned at the first district meetings.

"Sheet erosion was our first priority. We wanted to start at the top of the ridges and stop erosion at its source, and we wanted to get a land use plan established on each farm in the district. With 350 cooperators, we figured that would take about 5 years."

Gully control, control of erosion along streambanks and roads, tree planting, fencing, and terrace outlets were among the first conservation practices



Tremendous erosion problems could be seen throughout southeastern Minnesota in the early 1930's. Streambank erosion was among the first problems tackled by the state's first conservation district—the Burns-Homer-Pleasant SWCD.



applied in the Burns-Homer-Pleasant District.

Much of the early work took place in the Whitewater River watershed. Erosion had damaged land there to such a great extent that much of it had been on the tax delinquent list for years. "Hay was real short and fine, and erosion was so serious you couldn't get a stand of grass seed started," Dabelstein recalled.

"Most of the practices we used then are still good today. The engineering is new, of course. We're building bigger ponds and structures now, but if we had not used those smaller practices then, the big practices of today would be no good."

One of those early practices was the Grodoni terrace, used in very few, if any, other parts of the country. The idea came from Italy, where Mussolini was having them built to restore that country's eroded steep hillsides.

Both Dabelstein and William Sillman, the retired district conservationist for the Burns-Homer-Pleasant District, recall a visit from the agricultural attaché to the U.S. embassy in Italy. The bare, wornout hillsides of southeastern Minnesota reminded the visitor of the damaged areas of Italy, and he recommended the Grodoni terraces.

During the summer of 1936, WPA employees built seven Grodoni terraces on the south side of a steep hillside in the Burns-Homer watershed. These were actually rock walls about 6 feet wide and 15 feet apart built on the contour of the hill. Soil was piled on the uphill side of the rocks and was sloped northward in an opposite direction from the hillside's slope. The rock walls held water on the hillside. Workers planted trees and grasses on the uphill side of each terrace where they would be protected from the intense heat on the south-facing slopes.

Today, Dabelstein thinks that being a district supervisor is more difficult than it was back when he first began, despite the many evening meetings, the traveling, and the contacts that were necessary to organize the state's first soil and water conservation district.

Wing dams to control flooding and erosion were a widespread conservation practice along the rivers and streams of the Burns-Homer-Pleasant SWCD in its early years.



"When this district first started, we had no help from anywhere except SCS, and they couldn't do much until we organized ourselves," he said.

"Now, with so many people and agencies interested in conservation and environmental issues, it's turned around to the point that a responsible soil and water conservation district must work with many, many groups.

"It used to be that urban people took rural land for granted, but now they, too, have conservation concerns. They're seeing many of the land problems that we farmers have faced for years."

Having been a leader in the field for some 40 years, Dabelstein knows the importance of soil conservation planning. Yet, he is skeptical about what he sees as a growing trend toward planning.

"You can plan for 5 years, but if at the end of that time you don't have anything on the land, you really haven't done anything," he said.

"Getting things on the land" is really the goal for Dabelstein. He has seen what conservation practices can do for land. And he remembers, all too vividly, what can happen to land that is used with no concern for its upkeep.

"As more and more conservation districts were organized throughout Minnesota and the country, you could go up in a plane and see the real beauty of conservation on the land. People grew to love it."

Dabelstein shows just a hint of pride as he says that. He knows that he had a lot to do with getting it all started in Minnesota. Most of the land throughout the Burns-Homer-Pleasant Soil and Water Conservation District shows evidence that "Clint Dabelstein was here." ♦

Jupiter Pluvius Checked in Kansas

by Fred Trump
Information officer, SCS, Salina, Kansas

Every year has had its examples of flood damage and prevention in Kansas, even 1974, which was generally a drought year in the state.

But "The Wet Year" was 1973, when the watershed protection and flood prevention program in Kansas underwent a severe test.

Heavy rains in the late winter and spring caused flooding over much of the state; summertime floods occurred in a few places; and then, in September and October, unusually severe rains again caused flooding on much of the lowlands of the state.

For most areas, the most severe flooding of the year occurred during 2 days in October. Rainfall exceeded what would be expected once in 100 years and caused heavy flooding in unprotected valleys. In some cases crops were destroyed.

Damage in the Allen Creek Watershed on those 2 days, for instance, was estimated at $485,900, primarily in crop damage.

"Two-thirds of the flood plain was covered with water," reported Wayne Van Gundy of Americus, chairman of the recently organized Allen Creek Watershed District in Lyon County.

"A system of floodwater retarding structures would have cut flood damage by 55 percent," he said. "We had, in addition to crop damage, severe soil erosion because large amounts of land had been prepared for seeding to wheat. Many roads were blocked due to flooding."

The story was somewhat different in areas with completed dams. "The Wet Year" imposed a severe test, but completed dams performed well. Built under Public Law 566—the Watershed Protection and Flood Prevention Act—these dams are part of watershed projects that get their start from local efforts. P.L. 566 authorizes the Secretary of Agriculture to give technical and financial help to local organizations in planning and carrying out watershed projects. The program is administered by the Soil Conservation Service.

"Before the Upper Verdigris Watershed Project was put in, I was flooded out as many as three times some years," commented Arthur Harris of Virgil. "With as much rain as we had in 1973, the project was the difference between getting a crop and not getting one.

"I would have lost all of my bean crop and a good 10 percent of my corn. The river used to flood an area nearly a mile wide before the project; now it only gets out in the lowlands."

"Anyone who has lived on the Verdigris River all his life, as I have," added Fred Curry of Madison, "knows the tremendous sense of relief one has now that the Upper Verdigris Watershed Project has been

completed. In September when we had 12 inches of rain in 1 week, the river ran bank full—but we suffered none of the crop damage, heavy soil erosion, or fence damage that we used to have so often."

Floodwater damages were reduced by an estimated $3.9 million in 37 protected or partly protected Kansas watersheds during 1973, according to data compiled by the Soil Conservation Service watershed planning staff at Salina.

Of this, an estimated $2.1 million in flood damage was prevented by the 16 completed watershed projects under P.L. 566. Considering the heavy rainfall, the benefits in terms of crop protection could have been greater had plants been at more vulnerable stages of growth.

Additional protection from nearly $1.8 million in flood damage was provided in 21 watersheds where dam construction was underway.

About half of the total of $3.9 million in flood damage reduction was in the spring, with an estimated 15 percent in the summer and 35 percent in the fall of 1973. These figures do not include the protection offered by conservation prac-





Heavy rains had two different effects on these two farms in Kansas. At right, a farm in a flood plain in the Rock Creek watershed is protected by dams above it. Below, a grain sorghum field in central Kansas had no such protection from the flooding Smoky Hill River.

tices on farmland within the watershed—a basic part of the flood protection program.

By the end of 1974 some 421 dams had been built in Kansas in 37 projects at a construction cost of about $33 million. One-eighth of this cost was recovered in 1 year—in 1973—in flood damage reduction.

A detailed study of six watersheds tells a remarkable story of flood protection in "The Wet Year." The Upper Verdigris Watershed Project in Greenwood and Lyon Counties reduced flood damage an estimated $673,300 or about a fourth of the construction cost of the project.

In the Upper Fall River Watershed Project in Greenwood and Butler Counties, flood damage was reduced by $501,600—28 percent of the project's construction cost.

Timber Creek Watershed in Cowley and Butler Counties was also severely tested, with some areas receiving more than 10 inches of rain in 2 days in October. Flood damages were reduced $233,800, or about an eighth of the project's cost. Damage was heavy in the Dutch Creek tributary where only 6 of 10 planned flood protection dams have been built.

Flood damage in the Little Walnut - Hickory Watershed Project was reduced an estimated $256,700, or one-sixth of the cost of the project. This watershed is in Butler, Greenwood, and Cowley Counties.

Flood damage in the Walnut Creek Watershed was reduced by $140,100—15 percent of the cost of that project.

Without watershed projects there surely would have been a major agricultural disaster in 1973 in "the breadbasket state"—an important supplier of food to the nation and the world. ♦

SOIL CONSERVATION Index, Vol. 38 (August 1972 to July 1973). A limited number of copies are available by request from the magazine office in Washington, D.C.

Yearbook Features 'Shopper's Guide'

Arriving just in time to help consumers size up a variety of products and services and get the most for their money in the new year, the latest Yearbook of Agriculture is entitled *Shopper's Guide*.

Six sections feature information for shoppers on food, materials, equipment, gardening, services, and recreation.

The 1974 edition is a companion volume to the 1973 Yearbook, *Handbook for the Home*.

The *Shopper's Guide* is the 75th Yearbook of Agriculture. Yearbooks have been issued annually since 1894 except during wartime suspension of publication.

A copy of *Shopper's Guide* may be obtained for $5.70 at government bookstores or from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. In addition, each member of Congress has a limited number of copies of the Yearbook for free distribution to constituents. ♦

Soil surveys

Arkansas

Phillips County. By Jerry L. Hogan and James L. Gray. 1974. Soil Conservation Service in cooperation with Arkansas Agricultural Experiment Station. 78 pp., illus.; maps.

Colorado

Adams County. By John J. Sampson and Thomas G. Baber. 1974. Soil Conservation Service in cooperation with Colorado Agricultural Experiment Station. 72 pp., illus.; maps.

Florida

Brevard County. By Horace F. Huckle, Hershel D. Dollar, and Robert F. Pendleton. 1974. Soil Conservation Service in cooperation with University of Florida Agricultural Experiment Station. 123 pp., illus.; maps.

Kansas

Morris County. By Wesley L. Barker. 1974. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 53 pp., illus.; maps.

Meetings

Nebraska

Harlan County. By Lloyd E. Mitchell, Gilbert Bowman, and Donald A. Yost. 1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 65 pp., illus.; maps.

North Dakota

Ward County. By R. L. Howey, Cornelius Farris, Francis Glatt, Floyd Hauff, Simon Lahlum, Stuart Larson, Leonard Neubauer, and Frank Wahl. 1974. Soil Conservation Service in cooperation with North Dakota Agricultural Experiment Station. 92 pp., illus.; maps.

Ohio

Summit County. By A. Ritchie and J. R. Steiger. 1974. Soil Conservation Service in cooperation with Ohio Department of Natural Resources and Ohio Agricultural Research and Development Center. 117 pp., illus.; maps.

Oklahoma

McCurtain County. By Robert C. Reasoner. 1974. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 99 pp., illus.; maps.

February

6–8	*Catfish Farmers of America Convention, Little Rock, Ark.*
9–14	*Society for Range Management, Mexico City, Mexico*
10–14	*Annual Eastern Snow Conference, Manchester, N.H.*
19–22	*American Camping Association Mid-Atlantic/Southern Regions Convention, Washington, D.C.*
21–24	*American Association of School Administrators, Dallas, Tex.*
23–26	*Land Improvement Contractors of America, San Antonio, Tex.*
23–26	*Sprinkler Irrigation Association Technical Conference, Atlanta, Ga.*
25–26	*American Forest Institute, Atlanta, Ga.*
28–Mar. 6	*Associated General Contractors Convention, Honolulu, Hawaii*

March

5–8	*American Camping Association Mid-American Region Convention, Milwaukee, Wisc.*
9–14	*American Society of Photogrammetry, Washington, D.C.*
14–16	*National Wildlife Federation, Denver, Colo.*
15–19	*Association for Supervision and Curriculum Development, New Orleans, La.*
16–20	*American Concrete Pipe Association, Boca Raton, Fla.*
24–28	*Seventh Recreation Management Institute, College Station, Tex.*

April

2–4	*Thirteenth Annual Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho*
6–11	*American Chemical Society, Philadelphia, Pa.*
9–12	*American Camping Association Wesetrn Region Convention, Pacific Grove, Calif.*
13–16	*National Water Safety Congress, Milwaukee, Wisc.*
17–22	*National Audubon Society, New Orleans, La.*
20–23	*Association of American Geographers, Milwaukee, Wisc.*
21–24	*International Symposium on Livestock Wastes, Urbana- Champaign, Ill.*
21–25	*American Geophysical Union, Washington, D.C.*
21–25	*Annual Western Snow Conference, San Diego, Calif.*
27–May 1	*Garden Club of America, Washington, D.C.*

May

11–14	*National Forest Products Association, Washington, D.C.*
18–22	*American Institute of Architects, Atlanta, Ga.*
18–23	*National Council of State Garden Clubs, Inc., Salt Lake City, Utah.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

035
MAILING LIST

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / February 1975



A Concern For Life

More than ever before, the Soil Conservation Service is committed to conserving, not only soil and water, but also those living things which share those resources with man.

The depth of our concern is indicated by the growing number of biologists in the Service. During the last 7 years, a period in which the number of SCS employees decreased in every other major professional group, the biologists in the Service increased by two-thirds.

Their growing ranks have been of invaluable assistance to us in assessing the impact on living things—both plants and animals—of a wide spectrum of engineering and conservation measures. As a result of their advice, we have modified many plans and practices to protect and frequently to enhance the habitat of fish and wildlife.

Another indication of our concern for conservation of plants and animals is the series of special courses we have arranged for Service employees at three universities. Each accelerated course deals with a spectrum of subjects relating to the environment, enabling key employees to hear and debate the points of view of many of the nation's leading authorities in ecology, geography, and environmental law and administration. The courses also have given many of the professors new insight into the work and philosophy of the Service—as well as new appreciation of soil and water conservation.

Still another evidence of our concern for life is the SCS policy to participate in the nationwide effort to protect threatened and endangered species of plants and animals.

This is not a passive thing with SCS, but an active, searching imaginative program of protection that extends not only to plants, birds, fish, and mammals, but to all vertebrate or invertebrate animals that are rare or in danger of extinction.

It was about 1 year ago that two college students in Texas wrote our state office there, reporting that a timber company was cutting down a woods containing several of the last remaining plants of the silky camellia.

SCS promptly looked into the matter and discovered that brush had been piled on one camellia specimen, ready to burn. The timber company, which had been unaware of the rarity of the plant, worked with us and spent 2 days moving brush and providing shelter for other remaining plants. SCS employees were alerted to look for other specimens as they traveled about the state. Since then, we have located a number of other silky camellias in Texas and taken steps to protect them.

What's all this got to do with soil conservation? Perhaps everything. Our biologists have taught us that you can't put the environment into boxes labeled *soil, water, plants, animals;* you have to deal with it as a whole. Or as biologist Aldo Leopold put it in *A Sand County Almanac:* "When we see the land as a community to which we belong, we may be able to use it with love and respect."

Kenneth E. Grant

February 1975, Vol. 40, No. 7

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

SOIL conservation

Contents

2 From the Administrator

4 Recreational Opportunities in the Assunpink
Lawrence H. Robinson

6 Chevelon Canyon–A Plant and Wildlife Inventory Report
Leon Fager and Douglas Immekus

8 Working Together For Waterfowl
Earl D. Norwood, Jr.

10 Conservation Farming–With a Wildlife Bonus
Sharon Norris

12 'A Place They Call Finch Hollow'
Jan Curtis

15 Big Game Hunting at Fort Jackson
Larry Sandifer

17 Conservation Planning on State Game Lands in Pennsylvania
Keith Hinman and Clayton Heiney

20 "New Look" in Channel Work
James D. McCall and Russell Hyer

21 Wildlife Refuge In Miniature
Lawrence H. Robinson and James Preacher

22 Recon . . .

22 Soil Surveys

23 Meetings

COVER: Coordinated efforts in the Benton County Soil and Water Conservation District have resulted in an increased wood duck population (see story on p. 8).

Recreational Opportunities in the Assunpink

by Lawrence H. Robinson

Biologist, SCS, Somerset, New Jersey

Quality wildlife habitat near densely populated areas is priceless in New Jersey.

That's one of the reasons the 4,000-acre Assunpink Fish and Wildlife Management Area in central New Jersey attracts more than 55,000 persons a year.

Formed around a series of multipurpose dams and lakes built under Public Law 566, administered by the Soil Conservation Service, the area is a demonstration of federal, state,



David Bardin, commissioner of the New Jersey Department of Environmental Protection, greets a successful duck hunter at the Assunpink Lake dock. (Photograph courtesy of Division of Fish, Game, and Shell Fisheries, New Jersey Department of Environmental Protection.)

and local cooperation that has resulted in an invaluable public resource.

The Assunpink area offers hunting and fishing as primary recreation activities, but sightseeing, camping, nature study, birdwatching, horseback riding, hiking, and boating are also popular.

One unique use of the area is model airplane flying. A local club leases an acre for a model airplane field. It conducts flying contests with radio-operated model planes–and draws a number of sightseers.

Local school groups are already benefiting from an ecological interpretive center being developed for outdoor environmental education.

In addition, the area provides one of the best bird dog field trial areas in the East, according to Russell A. Cookingham, director of the New Jersey Division of Fish, Game, and Shellfisheries, which manages the Assunpink area.

"People come from all over the United States to enter their dogs," he said. A hunt club is also headquartered on the area.

A model wildlife development in the area illustrates many different types of upland wildlife management techniques, according to George Alpaugh, chief of wildlife management.

"The Division put in hedgerows and other permanent plantings for travelways and wildlife food and cover.

"We lease the best farmland to local farmers who are required to leave 15 percent of the crop for wildlife food. This saves the Division money for more permanent wildlife practices," Alpaugh said.

Pheasants are the most popular game species. Rabbits, quail, woodcock, ruffed grouse, squirrels, deer, raccoons, and foxes are also hunted.

Waterfowl populations are increasing, especially after the completion of the Assunpink Lake. This 225-acre reservoir attracts Canada geese, wood ducks, black ducks, mallards, and other waterfowl.

Hunting interest is so high that the Division has started a permit system to regulate the number of hunters on weekends to no more than 450 at any time. More than 6,000 hunters a year have sought game on this area.

Fishing opportunities were limited until the completion of the three watershed reservoirs. These reservoirs are managed as a warm water fishery, primarily for largemouth bass and bluegills. A boat launching ramp provides access to the lake.

Sponsors of the Assunpink Creek Watershed Project included the New Jersey Department of Environmental Protection, Mercer and Monmouth Counties, Hamilton Township, and Freehold and Mercer County Soil Conservation Districts.

"The project is a fine example of intergovernmental cooperation on federal, state, and local levels," Cookingham said.

"Of course, one of the objectives of the sponsors was flood prevention, but recreational opportunities were not overlooked.

"The U.S. Fish and Wildlife Service and the Bureau of Outdoor Recreation contributed matching funds, and New Jersey's Green Acres Program helped to purchase the Assunpink Fish and Wildlife Management Area." ♦

Chevelon Canyon—A Plant and Wildlife Inventory Report

Massive rock formations characterize the lower end of Chevelon Canyon.



by Leon Fager and Douglas Immekus

Biologist, SCS, Flagstaff, Arizona, and district conservationist, SCS, Holbrook, Arizona

Winding its way for 50 miles from the Mogollon Rim into the Little Colorado River, Chevelon Canyon in northern Arizona has been the site for 2 years of a plant and wildlife inventory.

The Museum of Northern Arizona undertook the inventory and classification of the biotic resources in the canyon to determine if the canyon had importance as a natural area. The inventory was requested in 1972 by the Navajo County Natural Resource Conservation District and was financed by the Soil Conservation Service and the U. S. Forest Service.

The result?

The recently published inventory and research report states that unless Chevelon Canyon is managed as a natural area, many of the rare plant and wildlife species found in the canyon are doomed.

It recommends that the canyon be carefully managed to hold man-related destruction to an absolute minimum.

"This does not exclude use of the canyon's resources by man," the report states, "but requires that such use be well analyzed as to its effect on the whole system."

Special emphasis was put in the report on protecting the riparian habitats along Chevelon Creek. Riparian areas are important to wildlife, particularly in arid and semiarid regions.

The riparian vegetation of Chevelon Canyon supports an estimated 197 animal species. Half of these species are dependent for at least part of their life cycle on this vegetation.

Among the threatened or endangered species found in the canyon are prairie falcon, osprey, bald and golden eagles, and black-tailed rattlesnake.

A pristine, unique area sustaining a diversity of habitats, Chevelon Canyon ranges in depth from 50 feet to 800 feet, and in width from 50 feet to a half mile. About a third of its land is administered by the U.S. Forest Service, with the remainder in state, private, and other federal lands.

The report was submitted to federal and state agencies, where it can be used as a tool in making land use decisions on the canyon, according to museum officials.

A possibility exists that an authorized group or agency might purchase or exchange some private and state lands within the canyon and then designate such portions of the canyon as natural areas. ♦

Working Together For Waterfowl

by Earl D. Norwood, Jr.

Biologist, SCS, New Albany, Mississippi

Improvement of waterfowl habitat over a large acreage is seldom the achievement of one conservationist working alone. Good examples of countywide wildlife developments are usually the result of coordinated efforts among interested groups and individuals.

Such is the case in Benton County, Mississippi. Here, many persons working together have erected nearly a hundred wood duck nesting boxes on floodwater retarding structures and ponds in the Tippah River Watershed, which drains about half of the county.

In 1972, the Benton County Soil and Water Conservation District Commissioners became concerned about the improvement of resident wood duck populations in 65,000 acres of the watershed. Officials of the three drainage districts involved were also concerned. At that time resident wood duck populations were low, even though an abundance of suitable habitat was available in the county's many watershed lakes, farm ponds, and natural wetlands. The limiting factor appeared to be the absence of suitable nesting cavities.

Mitigating measures suggested by the Soil Conservation Service involved erecting and maintaining artificial wood duck nesting boxes on 40 floodwater retarding structures and five farm ponds with suitable habitat.

Funds were available through the Yazoo-Little Tallahatchie Flood Prevention Project for materials but not for manpower. District Conservationist T. L. White estimated the project would take about 400 hours in all–180 hours to build the boxes, 180 hours to erect them, and about 40 hours a season to maintain them.

White found there were many willing hands to help with the job. Vocational agriculture students and Future Farmers of America clubs agreed to build the boxes, using materials supplied by the Soil Conservation Service. The U.S. Forest Service agreed to erect and maintain boxes located on watershed lakes in the Holly Springs National Forest. Local landowners and the Mississippi Game and Fish Commission agreed to erect and maintain boxes on private land.

When the need arose for sheet metal predator guards, the *Tupelo Daily Journal* donated a useful supply of offset printing plates and stimulated interest by publishing a news article.

The ducks accepted their new homes and produced a crop of ducklings.

Last year, an inspection of 25 percent of the erected boxes found that 63 percent were used during the first nesting season. Mother wood ducks expressed their preference for nesting over water by using all of the boxes erected on poles in the water.

Waterfowl food plantings and construction of wildlife

structures on oxbows along Tippah River have also increased the habitat potential for resident wood ducks.

Throughout 16 counties in the Yazoo-Little Tallahatchie Flood Prevention Project, interested groups are working together for waterfowl. In this coordinated effort, which has resulted in the erection of more than 500 nesting boxes in the last 4 years, no county offers a better example than Benton County. ♦

Wood ducks are the beneficiaries of these artificial nesting boxes put up in the Benton County Soil and Water Conservation District.



Conservation Farming—With a Wildlife Bonus

by Sharon Norris
Information specialist, SCS, Boise, Idaho



BURTT TRUEBLOOD

"If the angleworms in my field can't live, then I can't either," says Burtt Trueblood.

"I believe in conserving natural resources for the benefit of all life, right down to the micro-organisms in the soil."

Using a total conservation approach to farming, Burtt and Mary Trueblood have rebuilt the soil on their 200-acre farm in Canyon County, Idaho, into a productive and economical unit. Trueblood's belief that wildlife increases proportionately with the fertility of the soil is supported by the variety and abundance of birds and wild animals on their farm.

When the Truebloods returned to the family homestead from Alaska 10 years ago, Burtt found that he couldn't raise crops successfully on the run-down land. The soil was almost sterile and so compacted that his irrigation water simply ran across the fields instead of into them.

It took about $300 per acre and 3 years of cultivating plant residue back into the soil, along with a precalculated amount of fertilizer, before water would percolate into the soil. Trueblood's work has doubled the organic content of his soil and lowered the pH to about the optimum level.

"Each year," he said in an interview, "my crops get better, the yields go up, and I have more time to spend building the soil." His yields of alfalfa seed are double–and in peak years triple–the state average.

Many farmers feel that crop residue, especially alfalfa seed chaff, must be burned to prevent mouse, insect, and weed

problems. Trueblood just lets nature do her thing–with a little help from him. He plants alfalfa in 24-inch rows which enable predators to work in his fields to control mice and insects. After harvest the chaff is chopped, spread, and cultivated into the soil.

Pheasant broods on his farm average 9 to 10 chicks in contrast to an average of about 5 per brood in Idaho. His soil management system provides earthworms and other food when insects are killed by periodic insecticide spraying. Early spring nesting of pheasants and quail in alfalfa fields is discouraged by Trueblood and his two black Labrador dogs to prevent destruction of nests by farming operations. After spring farm work is over, the dogs are kept out of the fields so nesting can proceed.

Trueblood enjoys monitoring the species and number of wildlife on his farm. He estimated he had 150 cottontail rabbits last fall, with that number dropping to 50 after crops were harvested and refuge areas diminished. "That was probably due to less cover for protection against predators," he said.

The farm also supports a large population of quail, skunks, coyotes, muskrats, song birds, mink, and a fox.

Trueblood encourages some of the wildlife by piling brush and tree limbs in odd areas and corners as refuge for quail and rabbits. Natural cover is preserved in non-irrigated areas, and ditchbanks aren't burned until spring, allowing vegetation to provide shelter during the winter.

He makes skunk and rabbit dens by burying overturned 12-foot sections of concrete ditch lining with concrete pipe inlet and outlet for entrance and escape holes.

The space under his elevated bee houses also makes excellent escape areas. Trueblood provides the leaf cutter bees with sheltered nesting boards which he places around his alfalfa fields in time to coincide the bee hatch with the beginning of the alfalfa bloom.

Trueblood won't use sprays that are dangerous to man, animals, or soil organisms. He sprays for weed control, but not until there is enough plant growth to provide winter cover.

Soon after his soil building program began, Trueblood built silt-holding ponds below every field. "If you care enough to put them in," he said with a grin, "you never fill them."

He also had to learn to irrigate. He worked with the Agricultural Research Service on his irrigation problems, and a computer-designed irrigation system got him started on the right track. Irrigation water is carefully managed and applied according to the needs of the crops and characteristics of the soil. It takes a lot of know-how and observation because the soils are extremely variable in depth, texture, structure, and slope.

An active supervisor with the Canyon Soil and Water Conservation District since 1967, Trueblood is chairman of the Idaho Association of Soil Conservation District's Recreation and Wildlife Committee. He is also a member of the Landowner-Sportsman Council and has served as president of both the local and state Wildlife Federation.

The Trueblood believe they have accomplished what they started 10 years ago when they set out to establish a total conservation approach to agricultural productivity.

"Within the total picture of a well-balanced program, people see high yields as the ultimate," Trueblood said, "but nature's way is that all life benefits."

Because of the Trueblood's unique approach to conservation, people from far and near are attracted to the farm. Educators, professionals, and laymen alike are fascinated by this illustration of nature at work in a balanced ecosystem. ♦

'A Place They Call Finch Hollow'

by Jan Curtis
Information Division, SCS, Washington, D.C.



Lorrie Newman sings t center.

Up on a hill
and away from the road
There's a place they call
Finch Hollow.
The air is clean
and the grass is green;
I hope that you will follow.

This song, written by a high school student about the Finch Hollow Environmental Education Center in New York State, could express the feelings of more than 10,000 students who have used the center since it opened in 1971.

Near Binghamton, the center is one of the first in the nation to use the entire site of a Public Law 566 floodwater retarding structure as an outdoor learning area.

Known officially as Structure #1 in the Little Choconut, Finch Hollow, and Trout Brook Watershed Project, the 35-acre site includes a 2.3-acre lake nestled in a mixed hardwood forest.

The idea to use the site as a countywide outdoor classroom where school children could study watershed management and natural resources originated with Terry McCormick in 1969 when he was science coordinator at nearby Johnson City Senior High School.

Construction work on the reservoir was still underway when McCormick took his idea, along with sketches and photographs of the site, to the



A class meets outside the abandoned school building renovated to be the center's museum and headquarters.



g she wrote on Finch Hollow to students at the environmental education

contracting officer representative for the P.L.-566 project, Victor Caccaro.

Caccaro, assistant to the county executive, favors using all 20 planned reservoirs in the county for more than flood control. He encouraged McCormick and helped him clear the idea with the Soil Conservation Service, the county superintendent of schools, and the county government which owns the property.

McCormick then talked with members of the Johnson City Board of Education and convinced them to provide a nearby abandoned school building for a field study museum and headquarters.

Development of the center began with a donation of $500 from IBM and work from the Johnson City Jaycees, who painted the interior of the "new" headquarters.

"Once work began, everything seemed to fall into place," recalled McCormick.

The Johnson City Rotary Club donated tape recorders, mounting boards, and butterfly nets. A local lumber company donated lumber, plastic, and other building supplies. A local oil company overhauled the furnace. The Junior League of Broome County and the American Association of University Women donated field guides and reference books. A well-known local taxidermist, Lee Loomis, is donating birds from his collection for a permanent display.

The Soil Conservation Service developed a conservation plan for the 35 acres, with suggestions for trails and sites for the study of wildlife habitat management, erosion control, aquatic ecosystems, plant succession, timber management, soils, and native and introduced plant communities.

School children and local organizations helped lay out and mulch the trails, planted more than 500 trees, built bridges, walkways, and birdhouses, and helped repair damage done to the facilities by Hurricane Agnes in the spring of 1972.

In addition, under the Green Thumb program retired men in the community built shelters, a large duckhouse and screened enclosure, and an amphitheater at the center. The Green Thumbers–working under a program in which federal, state, and local governments cooperate to employ retired people–also helped repair the old school building and built lighted display cases.

The center received its first budget appropriation from the county in 1973–$6,000–shortly after a committee of county school children and teachers appeared before the county government seeking funds for the center. Jeanette Samuelson, a former teacher, was then



Terry McCormick and Jeanette Samuelson look over plans for the center.

hired as a part-time expert-in-residence.

The Finch Hollow Environmental Education Center is used not only by schools but many individuals and organizations, including Scouts working on conservation and environmental merit badges and local ecology clubs.

"One of the most important things the center gives is service to teachers," McCormick said. "Teachers are learning here–learning about natural resources and how to teach children about resources and resource management."

In addition to teacher training workshops conducted at the center, teachers enrolled in environmental education courses at the State University of New York at Binghamton, just 10 minutes away, use the center regularly.

Another regular user is Mrs. Francis Zielewicz, a sixth grade teacher from nearby Theodore Roosevelt Elementary School.

"I think you learn more outdoors," she said. "There is no law that says there must be four walls."

Even in 40-degree weather, with rain running off the brims of their rainhats and the tips of their noses, her students are just as enthusiastic.

"Isn't this a lovely day?" one commented. "It makes me feel fresh. I wish I could stay here forever."

"It would be really fun if all classes, kindergarten through seniors, could have classes here every day and could come outside and do art and math and things like that," commented another.

Come with me
and I'm sure you'll see
Things that you'll enjoy.
Mother Nature's way
of expressing love
To every girl and boy. ♦



An owl was here—and didn't finish its mouse dinner.



A quail hunter's delight—dogs at point. (U.S. Army photograph)

Big Game Hunting at Fort Jackson

by Larry Sandifer

Information officer, SCS, Columbia, South Carolina

The name of the game at Fort Jackson, South Carolina, is changing civilians into soldiers. But, aside from its military mission of turning out 7,000 soldiers a month, the 82-square-mile reservation bustles with other activities–such as the game management program administered as part of the fort's broad conservation efforts.

On weekends and holidays, the shots that ring out among the tall pines and sand hills are usually those of a happy hunter.

Big game hunting in the city

Much of the fort's 52,600 acres offers topflight deer hunting–all within the city limits of Columbia, South Carolina.

According to A. P. Cannon, wildlife biological technician, most of the wildlife population on the reservation has been built up during the last 20 years. The deer herd is no exception. In 1956, the estimated deer population was 95 to 100. Harvest records show that nine animals were taken during the 1956 season. Since then, 1,806 deer have been harvested. The current annual harvest has risen to about 150 animals.

The size of the deer herd has increased as a result of precise, well-planned management practices. Cannon cites planting 35 supplemental winter food plots of winter grasses, small grains, and clovers; creating permanent openings in the forest canopy; undercutting stands of scrub oak; and disking to encourage growth of native food plants.

The excess animals are harvested through controlled

hunts arranged within the military mission of the installation. Hunters are aided by 200 well-placed, elevated stands that provide not only a good view of the deer trails but offer a safe perch for the hunter. Adequate ground level stands are provided for elderly and handicapped persons.

Doves and dove proso millet

The 12 planted dove fields add to the total enjoyment of the Fort Jackson out-of-doors. Cannon estimates that 1,800 man-days of mourning dove hunting took place during the three-stage 1973-74 season.

The principal food crop in the fields is dove proso millet–a plant developed by the Soil Conservation Service at the Americus, Georgia, Plant Materials Center. Some of the earliest plantings in South Carolina were here. Seed from the Fort Jackson plantings has been shared with many other military installations throughout the Southeast.

Turkey hunting in the future

Turkey hunting has not been available on the reservation for many years, but things are looking up. Eight birds, stocked in March 1973, have multiplied to 30 or more in two flocks. Cannon thinks that with good management gobblers may be harvested within 4 years.

Roadside erosion control work has had a lot to do with the success of the turkey venture. Seed from the bahiagrass used on sloping roadbanks is also the best turkey food available. Cannon says the grass also harbors more insects than most other food plants, thereby making it a good year-round plant for both mature birds and poults.

Courting the bobwhite

The call of the bobwhite is as common as the cadence calls of the drill sergeants at Fort Jackson. Like most of the other wildlife species, their presence there is not by accident. Quail food plantings, mostly bicolor lespedeza, are too numerous to count.

Land management is the key

Wildlife protection and development is only a small part of the Fort Jackson total conservation program–judged to be the best in Continental Army Command in 1969. But, it all goes hand in hand, according to the land management team.

When they reclaim an abandoned firing range, they first stop erosion, but are also improving the wildlife habitat. Of course, they are planting for specific species when they use bicolor or dove proso, but the bahiagrass is not planted for the turkeys nor is abruzzi rye planted only for the deer and other native animals.

Since the days of the "Doughboys" of World War I Fort Jackson has been a strategic national installation. But in recent years it has become important in rather peaceful ways that help make life better for its professional soldiers, civilian employees, their families, and guests. The 290,564 man-days of hunting, fishing, and outdoor recreation tell the story. ♦

A valuable wildlife food tree, sawtooth oaks are planted at Fort Jackson. (U.S. Army photograph)



Conservation Planning on State Game Lands in Pennsylvania

by Keith Hinman and Clayton Heiney

Land manager, Pennsylvania Game Commission, and biologist, SCS, Harrisburg, Pennsylvania
(Reprinted from **Pennsylvania Game News,** September 1974.)

What does a visitor see when he visits one of Pennsylvania's state game lands? Hopefully he sees wildlife, because that's what the Game Commission's land management program is all about–managing the land to produce wildlife.

The visitor may also see access roads, food strips, parking areas, rifle ranges, hiking trails, waterfowl ponds and marshes, shrub and tree plantings, cutback borders, release cuttings, prunings, timber sale areas, timber stand improvements and browse cutting, which are all part of land management.

All of these may not exist on each of the state's 261 separate game lands, but if they are evident it's because they are part of a comprehensive management plan to provide optimum wildlife habitat.

Management of the state game lands has progressed through several important phases since refuge keepers first began such work in 1915. In 1946, the responsibility for managing game lands was transferred to the district game protectors.

By 1958, this task had become so complex and time consuming that full-time land managers were assigned to it. The land management job continued to grow, and in 1968 a new phase was begun–detailed planning for each of the 1,144,497 acres owned by the Game Commission.

This phase, undertaken with the assistance of the Soil Conservation Service, is aimed at further improvement of state game lands in Pennsylvania over the next 10 years.

Why are management plans needed? Basically, to provide optimum wildlife habitat on a tract of land. To meet this goal, it is important to insure continuity of operations when a land manager transfers to another area or retires. This need for continuity is illustrated by the Game Commission's Southcentral Division, which had a complete change of land management personnel in recent years. Many of the delays and interruptions that were experienced in the program could have been avoided if a comprehensive management plan had been available for each incoming land manager when he started his new job.

Management units

Under the new system of management, each game land is divided into compartments, or management units, based on size and physical features. A plan containing information necessary for successful conservation and management is then developed for each compartment.

The plans begin with an introduction which includes in-

formation on hunter activity, hunting pressure, future management needs, and species of game that are to be favored in management. This provides a history and background upon which decisions and goals for long-range management are based.

Most species of plants and animals are influenced by the soils upon which they live, so plans are based primarily on soils information. All plans contain a soil map, soil description, and interpretive information showing the suitability of soil on the game land for various food and cover plants, trees, roads, parking lots, and other uses. During the planning process, the land manager and the SCS soil conservationist use the soil information to help determine wildlife management alternatives. From these alternatives, the land manager selects those that best fit his situation and wildlife management goals. Then the wildlife management techniques and conservation measures needed to support the management are recorded as decisions in the plan.

At the heart of the conservation plan is a map and a record of the land manager's decisions concerning management and conservation treatment of the compartment.

The conservation plan map is prepared on an aerial photograph. It shows game land boundaries, fields, roads, food plots, impoundments, pipelines, and planned conservation practices. Supplementing this map is the narrative plan, which lists the land manager's decisions. Together, the map and the narrative indicate where food plots will be located, where various species of food and cover are to be planted, where parking lots and roads are to be constructed, and the conservation measures needed to protect and manage the area. A management plan for all significant wooded areas of the game land is also developed by a Game Commission forester for inclusion in the overall plan. It spells out how wooded areas will be managed to benefit wildlife.

The conservation plan map, the narrative of conservation treatment, and the woodland management plan are used to budget funds and prepare annual and long-range work plans. They allow one to tell at a glance what work has been scheduled, what has been accomplished, what remains to be done, and when specific work will be undertaken. This is not only invaluable to the Game Commission at all levels of operation and management, but is also used by the U.S. Fish and Wildlife Service in the allocation of federal funds for wildlife restoration work planned and accomplished by the Game Commission.

As more and more land is taken out of wildlife produc-



Geese nest at Pennsylvania's Middlecreek Wildlife Area—even before it is completed.

tion and used for homes, schools, industry, roads, etc., we are faced with the task of producing more wildlife on fewer acres. We believe this can best be accomplished through more intensive management of existing game lands based on comprehensive plans such as those described here.

The job of developing conservation and management plans is progressing rapidly. Fifty-three percent of the 1,045 game land compartments had been planned as of June 30, 1974, and it is expected that 90 percent of the game land compartments will be completed by June 1975.

What effects will these plans have on the game lands and the persons who use them? Here are some of the most obvious:

1. Improved habitat will provide more wildlife for sportsmen and the general public.

2. Management roads and public access roads will be constructed and maintained with consideration toward eliminating or reducing soil erosion.

3. Access trails will be provided or improved to better distribute hunting pressure. This will assure a better distribution of harvest and should reduce accidents. These same trails can also be used for hiking during the other months of the year.

4. Any new pipeline or powerline rights-of-way will be constructed in ways that minimize soil erosion.

5. Unique areas that might harbor rare vegetation or wildlife will be noted and preserved in their natural state.

6. Ponds and marshes will be developed, maintained or preserved to provide aquatic mammals and birds with their special environment.



Soil Conservationist George Rohrer of Lawrence County, District Conservationist Jesse Council of Beaver County, and Land Managers Keith Hinman and Richard Belding discuss alternatives for the restoration of a stripped area on State Game Land 285 in Beaver County.

7. Springs and spring seeps, which are vital to wildlife, will be preserved.

8. The forested area will be managed to provide game habitat as well as a profit from commercial timber sales.

9. Countless Pennsylvanians will benefit from conservation planning on state game lands: the hunter, the hiker, the photographer, the naturalist, the family who simply drives through a game land to observe animals in their natural habitat. But the most important benefits will fall to wildlife, as they should in this time of generally shrinking wildlife habitat. ♦

'New Look' in Channel Work

by James D. McCall and Russell Hyer
Biologist, SCS, and coordinator of watersheds and river basins, Indiana Department of Natural Resources, Indianapolis, Indiana

Buck Creek in east central Indiana was excavated 40 years ago. Seven miles of the old ditch have since silted in and restricted the flow from tile outlets serving hundreds of acres of prime cropland.

There was a need for better drainage for crop production and more efficient use of the fertilizers and fossil fuels being used to produce food for a hungry world. A multiagency interdisciplinary team of specialists used current policy to plan, design, and install the "new look" of channel work.

Channel restoration was done from one bank only. Existing tree cover on the other bank was saved and is serving as a filter strip, erosion-control stabilizer, wildlife habitat, and for other environmental purposes. The excavated spoil was smoothed and seeded to a mixture of grass and legumes for quick erosion control.

In the next step, 17,000 seedlings of 14 species of trees and shrubs were planted to help mitigate unavoidable habitat damage caused during construction. Some 40,000 Japonica lespedeza seedlings were also planted in a double row next to the channel. Areas adjacent to pasture were fenced to protect the plantings from livestock. All wildlife habitat preservation and replanting areas were designated by fence

A significant fishery has been re-established in the Buck Creek ditch, helped by deflectors, pools, riffles, and clear water.



or permanent boundary markers and protected by permanent easements.

Fish pools were dug and equipped with deflectors throughout the lower reach where perennial flow supports fish life. These deflectors, pools, riffles, and clean water have helped maintain a significant fishery of 14 species after the work was completed. Only 11 fish species were found before the construction was started.

Two other projects similar to Buck Creek are under contract in northern Indiana. They differ by having bedrock limestone in their lower reaches. One known as Rock Creek-Cass had a smallmouth bass spawning fishery in the area needing additional capacity. A contract has just been completed making a fishway consisting of a series of pools and riffles. Pools are 2½ to 4 feet deep and riffles are about one-half foot deep. Schools of fish, including young bass, moved upstream and occupied the pools within 2 weeks after completion of construction.

Continued evaluation is needed, but for now the "new look" looks very good. The agricultural food producing objectives are being met with fish and wildlife considerations being an integral part of the plan, design, and installation of channel work. ♦

Wildlife Refuge In Miniature

by Lawrence H. Robinson and James Preacher

Biologists, SCS, Somerset, New Jersey, and Columbia, South Carolina



Charles Strickland, manager of the Santee National Wildlife Refuge, inspects a dogwood planted to attract songbirds.

As soon as they get out of their cars in the parking lot, visitors to the Santee National Wildlife Refuge can begin birdwatching.

The idea of this refuge-within-a-refuge came from Charles Strickland, U.S. Fish and Wildlife Service refuge manager.

The Santee National Wildlife Refuge, at Lake Marion, South Carolina, is managed primarily for waterfowl. However, Strickland wanted an attractive wildlife habitat for songbirds at the entrance to the nature trail.

He contacted Soil Conservation Service personnel through the Clarendon Soil and Water Conservation District for planning assistance.

SCS developed a plan for feed plantings, and Karl Graetz, SCS plant materials specialist, supplied many of the plant materials for field trials. In addition, plants were transplanted from wooded areas in the refuge.

The miniature refuge contains autumn olive, flowering crabapple, pyracantha, dogwood, thorny elaeagnus, bush honeysuckle, holly, red cedar, wingnut tree, Chinese pistache, and sunflowers.

A small grassy plot diversifies the area.

Songbirds are thus enticed by food and cover . . . and visitors can get an easy view of many species.

"Cardinals, robins, and bluebirds cleaned the berries from autumn olive bushes after one snowfall," Strickland reported. And crabapple trees are another favorite. The trees were specially selected by SCS plant materials specialists for the smaller crabapples they produce. More than 20 species of birds have been seen sampling the fruit.

In addition to its other attractions, the miniature refuge demonstrates to visitors how they might landscape their own yards to attract songbirds. In fact, an exhibit at the center also includes a section on how to attract birds. ♦

Recon . . . Soil surveys

Newest pollution watchdog–lasers. NASA, EPA, and MIT are all working on ways laser beams can be used to throw light on the subject of air pollution. The National Aeronautics and Space Administration has been testing a laser-based LIDAR (Light Detection and Ranging) system for remote measuring of sulfur dioxide content of power plant stack gases. The Environmental Protection Agency is working on a LIDAR system for mapping the boundaries of air inversions in their early stages, before they become invisible. The Massachusetts Institute of Technology is working on measuring sulfur dioxide and ethylene (a hydrocarbon pollutant) via lasers. The NASA and EPA studies are based on the reflectance of light by air pollutants; the MIT study works on the characteristic of some substances to absorb, rather than reflect, laser light.

NEW PUBLICATIONS

Environmental Do's and Don'ts on Construction Sites. *1974. USDA-Soil Conservation Service. Misc. Pub. 1291. 32 pp., illus. $0.65.* What to do—and not to do—to protect the environment at construction sites is the theme of this illustrated booklet.

Arizona

Eastern Maricopa and Northern Pinal Counties Area. By E. D. Adams. 1974. Soil Conservation Service in cooperation with Arizona Agricultural Experiment Station. 61 pp., illus.; maps.

Illinois

Greene County. By C. E. Downey, D. R. Grantham, and J. B. Fehrenbacher. 1974. Soil Conservation Service in cooperation with Illinois Agricultural Experiment Station. 85 pp., illus.; maps.

Indiana

Hendricks County. By John M. Robbins, Jr. 1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 69 pp., illus.; maps.

Kansas

Harvey County. By Bruce R. Hoffman and Louie W. Dowd. 1974. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 55 pp., illus.; maps.

Missouri

Barton County. By Harold E. Hughes. 1974. Soil Conservation Service in cooperation with Missouri Agricultural Experiment Station. 76 pp., illus.; maps.

North Carolina

Pitt County. By Edwin H. Karnowski, J. B. Newman, James Dunn, and J. A. Meadows. 1974. Soil Conservation Service in cooperation with North Carolina Agricultural Experiment Station. 73 pp., illus.; maps.

North Dakota

Burleigh County. By Howard R. Stout, William F. Freymiller, Francis J. Glatt, Robert D. Heil, Monte C. McVay, James H. Thiele, and Paul K. Weiser. 1974. Soil Conservation Service in cooperation with North Dakota Agricultural Experiment Station. 112 pp., illus.; maps.

Texas

Coleman County. By O. L. Botts, Buford Hailey, and Wayburn D. Mitchell. 1974. Soil Conservation Service in cooperation with Texas Agricultural Station. 70 pp., illus.; maps.

Cottle County. By Wayne E. Richardson, Johnny Hajek, Earl Blakely, and Conrad Neitsch. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 71 pp., illus.; maps.

Jim Hogg County. By Russell R. Sanders, Charles M. Thompson, DeWayne Williams, and Jerry L. Jacobs. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 41 pp., illus.; maps.

McCulloch County. By Otto W. Bynum and John L. Coker. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 91 pp., illus.; maps.

Navarro County. By William D. Meade, W. Glen Chervenka, and James M. Greenwade. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experimental Station. 69 pp., illus.; maps.

Washington

Garfield County Area. By Miles L. Raver. 1974. Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. 71 pp., illus.; maps.

Wyoming

Riverton Area (Fremont County). By Jack F. Young. 1974. Soil Conservation Service in cooperation with Wyoming Agricultural Experiment Station. 87 pp., illus.; maps.

Meetings

March

5–8 *American Camping Association Mid-American Region Convention, Milwaukee, Wisc.*

9–14 *American Society of Photogrammetry, Washington, D.C.*

14–16 *National Wildlife Federation, Denver, Colo.*

15–19 *Association for Supervision and Curriculum Development, New Orleans, La.*

16–20 *American Concrete Pipe Association, Boca Raton, Fla.*

24–28 *Seventh Recreation Management Institute, College Station, Tex.*

April

2–4 *Thirteenth Annual Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho*

6–11 *American Chemical Society, Philadelphia, Pa.*

9–12 *American Camping Association Western Region Convention, Pacific Grove, Calif.*

13–16 *National Water Safety Congress, Milwaukee, Wisc.*

17–22 *National Audubon Society, New Orleans, La.*

20–23 *Association of American Geographers, Milwaukee, Wisc.*

21–24 *International Symposium on Livestock Wastes, Urbana-Champaign, Ill.*

21–25 *American Geophysical Union, Washington, D.C.*

21–25 *Annual Western Snow Conference, San Diego, Calif.*

27–May 1 *Garden Club of America, Washington, D.C.*

May

11–14 *National Forest Products Association, Washington, D.C.*

18–22 *American Institute of Architects, Atlanta, Ga.*

18–23 *National Council of State Garden Clubs, Inc., Salt Lake City, Utah*

June

1–4 *Twenty-second National Watershed Congress, Portland, Ore.*

8–12 *General Federation of Women's Clubs, Washington, D.C.*

8–13 *American Water Works Association, Minneapolis, Minn.*

16–20 *American Geophysical Union, Washington, D.C.*

18–20 *Twelfth National Agricultural Plastics Conference, Atlantic City, N. J.*

22–25 *Sixty-eighth Annual Meeting of American Society of Agricultural Engineers, Davis, Calif.*

23–25 *American Plywood Association, Vancouver, Canada*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

1.6
035
Ap

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / March 1975

U.S. DEPT. OF AGRI
NAT'L AGRIC. LIBR
RECEIVED
APR 30 '75
PROCUREMENT S
CURRENT SERIAL REC



From the Administrator

Informing, not Dictating

When SCS began in the 1930's, field people learned quickly that they couldn't make decisions for farmers. If they "oversold" conservation practices, landowners referred to the work as "those SCS terraces" or the "government's grassed waterway."

Those early experiences led to the idea of the conservation plan, with the SCS technician supplying all the information he could and the landowner selecting from among various alternatives and making the conservation decisions himself.

This is still the way that SCS operates, whether with individual farmers and ranchers or with public bodies, like school districts or zoning boards or county commissions. SCS presents the facts about various alternative uses of land; the public bodies decide what to do and when to do it.

It would be a useful exercise for each SCS employee to consider the distinction between furnishing information and making decisions; between describing alternatives and providing solutions.

Our soil surveys are a case in point. It is one thing to point out that there are severe limitations on building homes on a particular soil; it is quite another to say that people should never build there. The latter course, if it is taken at all, is the job of locally elected representatives of the people.

There are thriving cities in America today which are built on soils with severe limitations for construction. Some are built on poorly drained soils; some on shrink-swell soils; some on steep or sliding soils; some on landfills. Obviously, the people who built those cities decided that other considerations outweighed the difficulties presented by the soils and were willing to pay the price. But every now and then I meet a conservationist who, if he had his way, would never have permitted the creation of a New Orleans, a San Antonio, a San Francisco, or a Chicago.

So I repeat, in most cases it is not the business of the Soil Conservation Service to tell people how to use their land. It is our business to give people information about their soils and how to manage their soil and water wisely. We also should help them calculate the price tags on various alternative actions. But we don't make up their minds for them.

One exception to our role of technicians is in preserving prime agricultural land from encroachment. It is Department policy to advocate preservation. But here, too, SCS people can be most effective when they offer local people workable alternatives to taking good land out of farming.

We also possess a growing body of information on small watershed hydrology, and we also need to make sure that these facts are made available to developers, public bodies, and groups of citizens. But again, we are on the right track when we report that increased flood frequency may result from a certain level of development. But it is something else to call for a halt to further development. That is something for the local people to decide.

Kenneth E. Grant

SOIL conservation

March 1975, Vol. 40, No. 8

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in transaction of public business required by law of this Department. Use of funds for printing **Soil Conservation** has been approved by the Director of the Office of Management and Budget through July 31, 1978.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

Contents

2 From the Administrator

4 Land Use Concerns In Mid-America
Roger Coleman

6 Farming on a Historic Site
Delmas E. Carr

8 Colorado Teacher, South Carolina District Receive Top Education Awards
Jan Curtis and Jerry D. Schwien

12 Snowmobiles
Vincent J. Price

16 Texas Project Focuses on Plants for Shoreline Erosion Control
Arnold G. Davis and Arthur L. Bell

18 Erosion Control at Construction Sites
Robert L. Bond

20 Shifty Soils In Jackson
W. M. Koos and W. A. Cole

21 Recons

22 Review

22 Soil Surveys

23 Meetings

COVER: Many conservation and site management practices can reduce or eliminate erosion and sediment problems at construction sites. This illustration is from SCS's new publication, *Environmental Do's and Don'ts on Construction Sites.*

Land Use Concerns In Mid-America

by Roger Coleman

Resource conservationist, SCS, Kansas City, Kansas

Land use problems have perplexed conservation districts on the Kansas City urban fringe for many years.

Today, all eight conservation districts in the greater Kansas City area are working together to solve some of these land use problems at the local level.

Formed in 1973, the Mid-America Association of Conservation Districts (MAACD) works to preserve prime agricultural land, promote erosion and sediment control, and provide a forum for local government officials and the general public to discuss land use issues.

The association got its start in 1971 when supervisors of six conservation districts in the greater Kansas City area met to discuss common land use problems.

These supervisors—from Johnson, Leavenworth, and Wyandotte Counties in Kansas and from Cass, Clay, and Ray Counties in Missouri—got together for a year and then adopted a constitution. Last year, soil and water conservation districts were formed in Platte and Jackson Counties in Missouri and these districts joined MAACD.

Deciding that resource planning was a key to proper land use, the association developed a memorandum of understanding with the Mid-America Regional Council, which has regional planning authority for the eight-county Kansas City region.

A major thrust of the association has been to provide a forum for land use issues. Last

The need for erosion and sediment control: silt fills a creek channel in Wyandotte County, Kansas. The eroded soil comes from an unprotected mobile home park.



January, a second land-use symposium was held, focusing on tools that can be used by the land use planner. Featured speakers were Norman Berg, associate administrator of the Soil Conservation Service, and Nick Lally, chief of the flood plain management section, U.S. Department of Housing and Urban Development. Follow-up discussion meetings are planned for each county in the region.

Sponsors of the symposiums include the Cooperative Extention Service of Missouri and Kansas, Mid-America Regional Council, League of Women Voters, Soil Conservation Service, and Pony Express and Show-Me Chapters of the Soil Conservation Society of America.

A bus tour this spring of part of the region will acquaint local officials with land use problems of concern to conservation districts.

To better acquaint the community with land use problems, MAACD has been involved in a wide range of activities:

—Association members and SCS employees have appeared on a number of half-hour radio and TV programs to discuss land use. Spot announcements have also been used extensively on radio and cable TV.

—An environmental awards program was developed by the association. A local newspaper reporter received an award for 26 feature articles dealing with the activities of MAACD and individual conservation districts. A radio station, a developer, a city planning commission, and a county planning and zoning commission also received awards for their efforts in improving the environment.

—A land use policy statement has been developed by the association and circulated to local units of government. This statement emphasizes the need for regional and local planning, use of resource data in land use planning, and preservation of prime agricultural land. All member districts have endorsed the policy statement and use it as a guide in making local conservation decisions.

—The association provides soils information to local governments, developers, and individuals for facts in land use decisions. About a third of the region is mapped, and a general soil survey of the region is being prepared cooperatively by the Soil Conservation Service and the Cooperative Extension Services of Missouri and Kansas.

In addition, the Regional Council has been placing standard soil survey information on a land factors atlas as soil mapping is completed. This atlas contains overlay maps of existing land use features such as location of water lines, sewers, roads, and housing. The Council will also publish an interpretive legend dealing with urban soil use to be prepared by the University of Missouri. The soil data will be on interpretive colored maps.

—MAACD and the Mid-America Regional Council legal staff have been preparing a model erosion and sediment control ordinance that can be adopted by any of the 110 local jurisdictions in the mid-America region. The association developed urban erosion and sediment control standards and specifications to be referred to in the model ordinance.

The need for erosion and sediment control in the developing areas around Kansas City was one of the concerns that led to the formation of MAACD.

Harley Bogue, vice president of MAACD, notes that his Clay Council Soil and Water Conservation District has been fighting erosion on farm land for 30 years.

"We now see the problem compounded as land is left without vegetative protection while development takes place. All lakes in the Kansas City area are seriously threatened by siltation."

Another land use concern among the district supervisors is the need to preserve prime agricultural land.

"My taxes have almost doubled since my farm was annexed by Kansas City, Kansas," said Leon Lallier, president of MAACD and a dairy farmer in Wyandotte County.

"I no longer hear bulldozers constructing conservation measures. Now they are digging basements.

"Strip and cluster developments, wasteful of agricultural land, extend from the developed part of Kansas City 7 miles to the dairy farm that has been in my family for 104 years. Septic tank problems accompany the development, as most soils in the mid-America region are not suited for septic tank use."

One project of the Land Use Committee is to develop a definition of prime agricultural land.

"We refer to prime agricultural land in our policy statement but we do not define it," John Townsend, chairman of the MAACD Land Use Committee, said. "We need a definition that will fit local conditions."

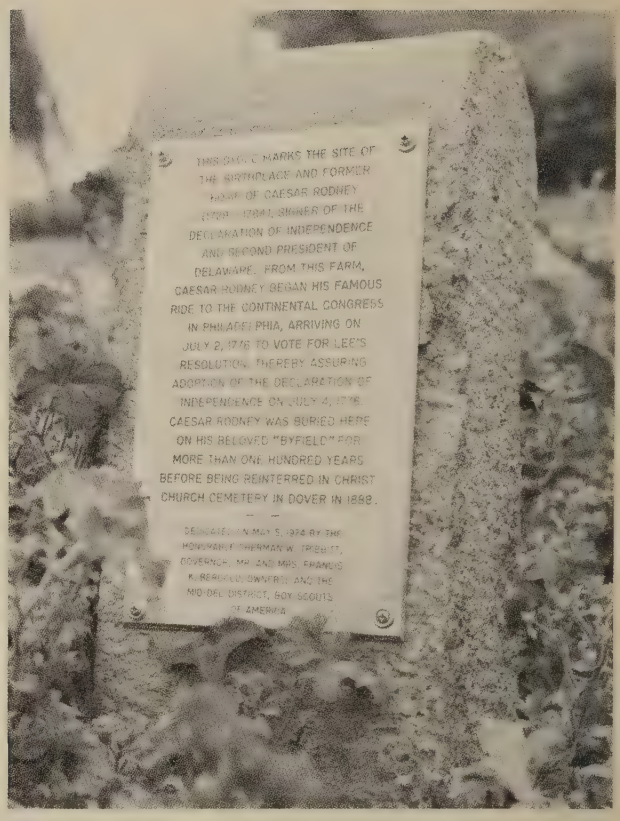
A spinoff of association activity has been an awareness developed by conservation district supervisors of the complex nature of land use planning and the interrelationship of natural resources and actions of people.

Supervisors are now being heard and their suggestions are considered when land use decisions are made in the Kansas City region. ♦

Farming on a Historic Site

by Delmas E. Carr*

Soil conservationist, SCS, Parkersburg, West Virginia



A market at 'Byfield' in Delaware tells of its former owner, Caesar Rodney.

The farm of Caesar Rodney, whose signature made Delaware the first state to ratify the Declaration of Independence, is today a conservation showplace.

Its owner—Francis K. Bergold, a cooperator with the Kent County Conservation District—was named outstanding conservation farmer for Kent County several years ago. He has one of the outstanding conservation farms in that part of the country, according to Isaac Thomas, chairman of the Kent Conservation District and Northeast Director of the National Association of Conservation Districts.

Bergold purchased the farm—which Rodney named "Byfield"—in 1951 and began the slow process of turning the historical farm into a profitable enterprise.

A former Long Island potato farmer, Bergold at first grew potatoes almost exclusively on the 600-acre farm near Dover. He started a three-crop rotation of potatoes, soybeans, and barley to make his soil more productive.

Looking for further technical help, he became a cooperator with the Kent County Conservation District in 1953. With the help of the district conservationist, Fred Mott, Bergold planned three irrigation ponds, an irrigation system for much of his land, an irrigation waste management system, wildlife management practices, and proper drainage systems for his cropland. In fewer than 20 years, Bergold transformed his

*Author was formerly a soil conservationist in Dover, Delaware.



Francis Bergold (right) and author discuss engineering design and layout of future tile work at 'Byfield.'

farm into a model of conservation practices in the area.

The Bergolds, very much interested in the history of their farm, point out that Rodney was born and raised there. He returned to Byfield in his later years and was buried there in 1784. He now rests at historic Christ Church in Dover.

Rodney's farming activities were not recorded, but like many other colonial farmers, he probably grew corn, wheat, and a variety of vegetables for home use and raised dairy and beef cattle.

The Bergolds had an especially close link with Rodney for nearly 20 years—living in his old house. However, the house was so deteriorated—and little public interest existed to preserve it—that the Bergolds replaced it with a new home.

Recently, Governor Sherman W. Tribbitt presented a small monument to the Bergolds to mark the site of the Rodney home. ♦

Colorado Teacher, South Carolina District Receive Top Education Awards At NACD Convention

by Jan Curtis and Jerry D. Schwien

Information Division, SCS, Washington, D.C., and information officer, SCS, Denver, Colorado

More than 700 teacher and conservation district entries were judged in the first annual Education Awards Program in Environmental Conservation sponsored by the National Association of Conservation Districts (NACD) and Allis Chalmers Corporation.

Mike McMillan, a social studies teacher in Hotchkiss, Colorado, won top honors in the teacher category—and a check for $1,500. The award, presented at the NACD Convention in Denver in February, was in recognition of a teacher who had been responsible for implementing an outstanding environmental conservation education program in his or her school system. McMillan was nominated by the Delta Soil Conservation District.

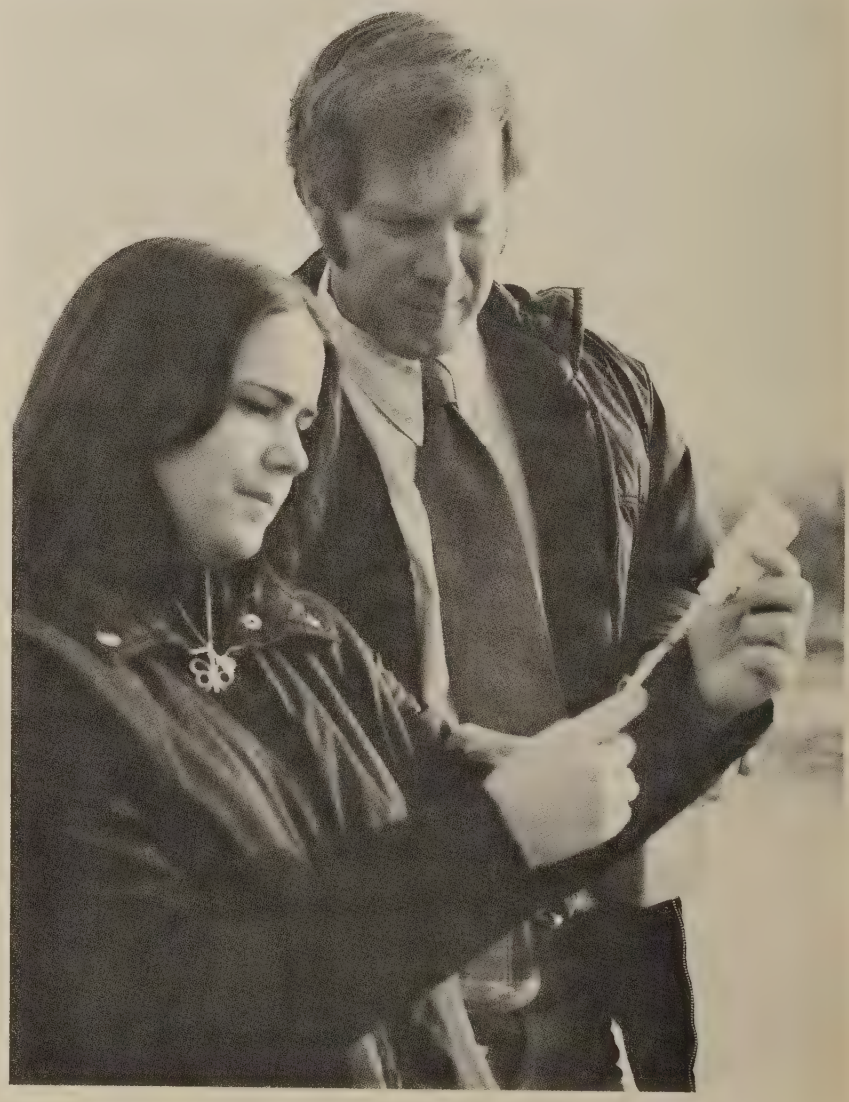
The Greenville Soil and Water Conservation District (SWCD) in South Carolina won the national district award, also $1,500, as the conservation district that had carried out an outstanding environmental conservation education program system.

"National recognition is great," said McMillan after receiving his award, "but the most satisfaction is seeing students, for whom you have helped open a path, take off on their own initiative."

The multidisciplinary instructional units McMillan developed for grades 6 through 12 are student-project oriented. Students plan and conduct their own projects individually or in groups.

Projects have included a 3-year water testing and pollution monitoring study on the North Fork of the Gunnison River in cooperation with the Environmental Protection Agency and

Mike McMillan, Conservation Teacher of the Year in the NACD-Allis Chalmers Awards Program, helps a student in a water quality test.





W. B. Bennett, Jr., chairman of the Greenville SWCD which won the first Conservation District Award, works with teachers in developing outdoor classrooms on school sites.

a "Mass Mosquito Murder" research effort into ways of controlling a local mosquito problem and the consequences of each alternative.

McMillan, a social studies and biology graduate of the University of Northern Colorado, has also helped organize and conduct in-service training sessions for local teachers; participated in the development of the Colorado master plan for environmental education; and organized the Hotchkiss Invitational Fair designed to promote public understanding and participation in environmental studies. He is currently planning a series of study units designed to provide opportunities for eleventh and twelfth grade students to work directly with local agencies in formulating a rational energy resource development plan for Delta County.

The Greenwood SWCD, in addition to helping plan outdoor classrooms on three college campuses and 45 school sites, helps in site selection and property development for all new schools in the county.

"This service alone," said J. F. Hall, superintendent of the school district, "has been extremely valuable in saving the school district a tremendous amount of money by enabling the district to avoid costly mistakes which could have been made through poor site selection."

Through 3 years of persistent effort, Greenwood SWCD officials, under the chairmanship of W. B. Bennett, Jr., succeeded in having a 62-acre site on Roper Mountain deeded to the school district for development as an Environmental Science Center. The site, valued at $2 million and formerly used for the 1970 state tricentennial observance, is expected to serve more than 250,000 students a year.

At the recommendation of the SWCD, an environmental science consultant, Brice M. Latham, was hired by the school district.

Among his other duties, Latham arranges an annual 3-hour credit conservation education workshop cosponsored by the SWCD for 80 to 85 county teachers. Latham is a retired area conservationist for the Soil Conservation Service.

Each year the SWCD sponsors conservation essay and speaking contests; presents a cash award to the outstanding conservation teacher in the county; provides funds for SWCD youth commissioners and school district personnel to attend regional and national NACD meetings; sends five young people to the South Carolina Resource Conservation Workshop for Youth; and provides 20 locally prepared slide sets to teachers for classroom use.

The SWCD and school district also assist Ben Leonard, a SWCD commissioner and TV personality, produce a weekly education show on conservation.

Other winners in the Education Awards Program in Environmental Education in the teacher category were:

Southeastern Region — Mrs. Irene McIver, third grade in Greensboro, North Carolina, nominated by the Guilford County SWCD. Mrs. McIver was runner-up for national honors for her work in developing a "Nature Trail Game" and sev-

eral conservation oriented teaching units.

Northeastern Region — George Weisel, elementary teacher from Coopersburg, Pennsylvania, nominated by Lehigh County Conservation District. Weisel's extensive program with schools and community organizations is based on a multidisciplinary educational approach to conservation studies.

Upper Mississippi Region — Dr. Magdaline A. Davis, teacher-consultant in outdoor education with Indianapolis schools, nominated by Marion County SWCD, Indiana. Dr. Davis developed a program for kindergarten through sixth grade that makes use of outdoor learning sites and includes 4 weeks of study for sixth graders at a resident camp.

South Central Region — Mrs. Linda Tontz of Guthrie, Oklahoma, nominated by Logan County Conservation District. Mrs. Tontz developed a sixth grade interdisciplinary unit in environmental studies. She also conducted the teachers workshop in conservation for which the SWCD provided matching funds for the state-supported training session.

Northern Plains Region—Mrs. Clarice Wittig, fifth and sixth grade teacher in Stickney, South Dakota, nominated by Aurora County Conservation District. Mrs. Wittig, who retired at the end of the school year, incorporated many disciplines in her environmental education program.

Pacific Region—Jim Christensen, sixth grade teacher in Pendleton, Oregon, nominated by Umatilla County Conservation District. A firm believer in outdoor learning projects in environmental studies, Christensen has received statewide recognition for his leadership in environmental education, working with other schools, adults, civic organizations, and college groups in addition to his programs in the Pendleton schools.

Regional winners in the district category included:

Upper Mississippi Region—Kalamazoo Soil Conservation District (SCD), Michigan, runner-up for the national award. With the help of its Junior Board of Directors, the SCD has helped more than 50 schools develop school site conservation plans. In 1970, the SCD hired an educational coordinator to work with teachers on conservation and outdoor classroom programs. Each year the SCD sponsors in-service workshops for teachers on how to use school sites for environmental studies; presents a rotating award to the school showing the most outstanding accomplishment in environmental improvement; and cosponsors a Conservorama field day for all fifth graders.

Northeastern Region — Dauphin County Conservation District, Pennsylvania, for helping nine schools develop outdoor classrooms; helping plan another 10; and arranging and sponsoring a tri-county environmental education workshop for teachers. Classes were held in the evenings for 6 weeks and the 16 instructors representing various cooperating agencies in the SCD were approved by the State Education Department.

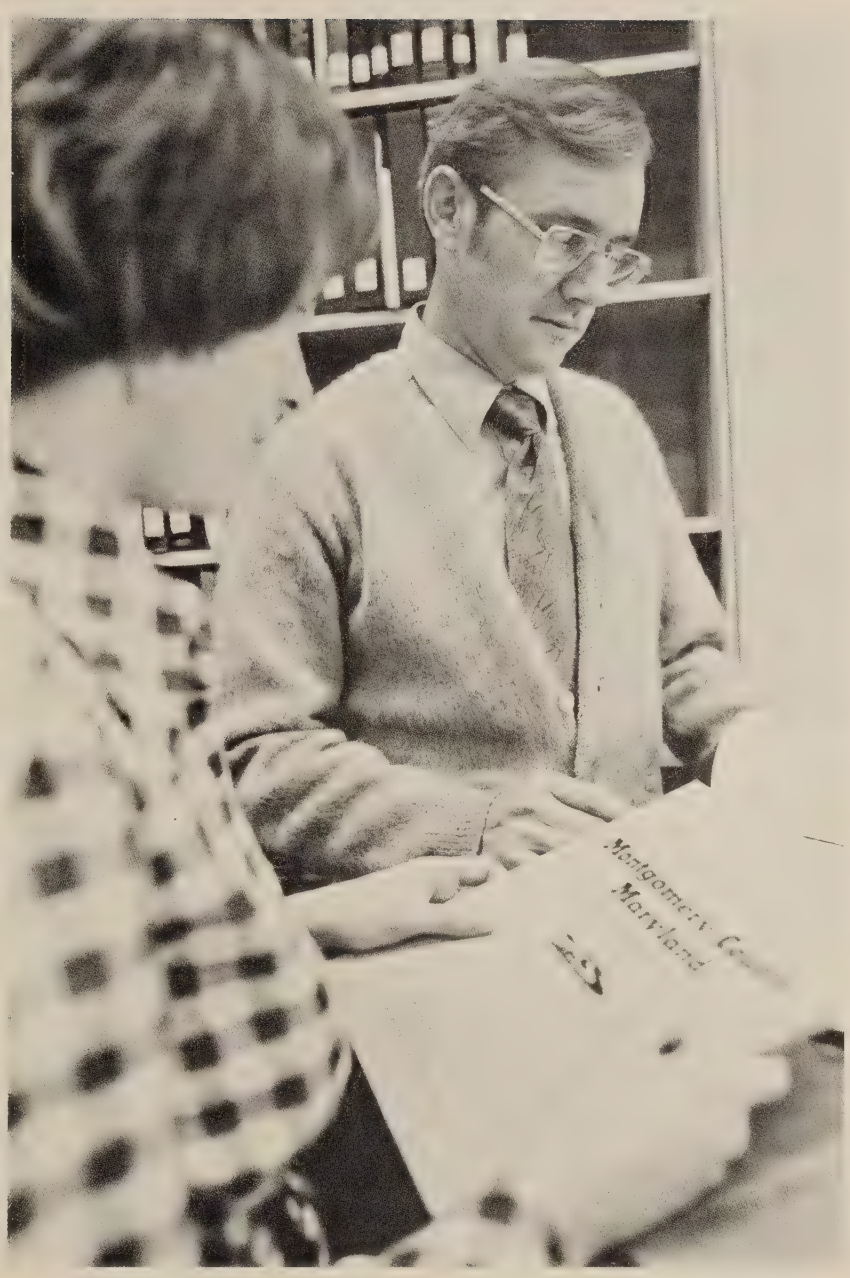
South Central Region—Lubbock County Soil and Water Conservation District, Texas, for helping develop classrooms; sponsoring in-service workshops for teachers; and providing tuition for teachers to attend summer sessions in environmental education. Copies of the SWCD program and plan-of-work are given to libraries and used in agriculture classes.

Northern Plains Region — Chouteau County Conservation District, Montana, where assistance is provided for school site conservation plans and a Flying Classroom conservation program. The conservation district also participates in high school

Career Days when students spend the day in the district office and in the field learning conservation work. Drafts of the annual plan-of-work are sent to all schools in the conservation district for student input.

Southwestern Region—North Cache County Soil Conservation District, Utah, for initiating the development of curriculum manuals for kindergarten through twelfth grade; sponsoring 1- and 2-day workshops throughout the year for 200 to 300 teachers; helping develop a 2-acre outdoor laboratory at Sky View High School to serve 10,000 students; and sponsoring a conservation education contest for all children in the eight elementary schools.

Pacific Region—Contra Costa Resource Conservation District (RCD), California, where assistance on site development was provided to 36 schools, 12 of which now have outdoor classrooms in operation. The RCD also helps with a marine ecology monitoring and study program involving students from 55 high schools. In cooperation with the County Superintendent of Schools and the Juvenile Authority, the RCD has budgeted $3,000 to establish a plant nursery at County Juvenile Hall to teach youngsters nursery operation and to furnish planting stock for school sites. ♦



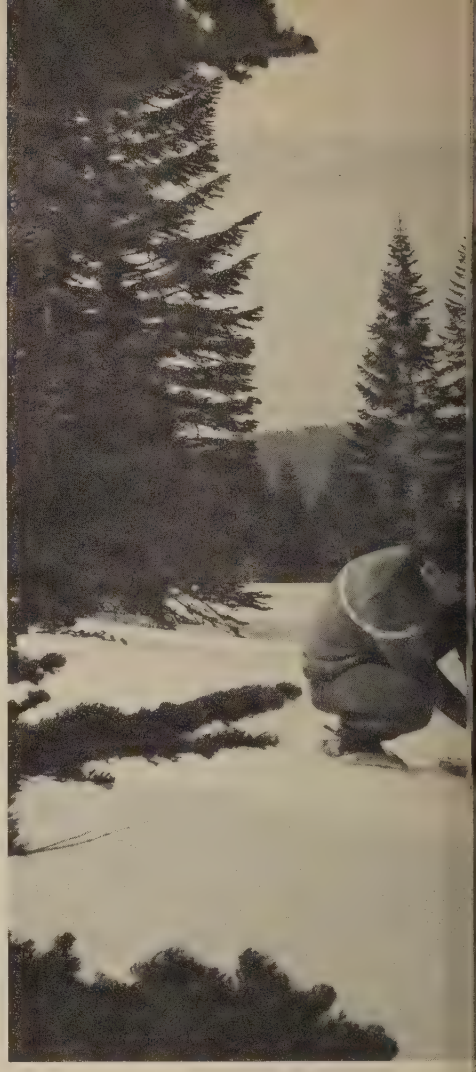
Reference Use

Dr. Fred Miller of the University of Maryland checks a published soil survey at the McKeldin Library on campus. Modern soil surveys have been published for about one-fourth of the counties in the United States and are available for reference use in many libraries. Produced by the Soil Conservation Service in cooperation with state agricultural experiment stations and other federal and state agencies, the surveys include a technical description of the soils and information on their use and management.

SNOWMOBILES
The Winter Revolution

by Vincent J. Price

Information Division, SCS, Washington, D.C.



SCS snow survey

Snowmobiles, millions of them, have descended on the northern winter scene as if from another planet. They are a major new form of recreation; but they pose serious questions about land use, privacy, and the environment.

The Soil Conservation Service is in a unique position when it comes to snowmobiles. SCS is an environmental agency; an agency dedicated to improving rural recreation opportunity; it has studied the nature of snow for 30 years; and it helped invent lightweight over-snow machines. But the snowmobile revolution poses as much of a challenge, and as much of a dilemma, for SCS as for everyone else north of the snow line.

Snow surveys and snowmobiles

For more than 30 years, SCS has provided western states with water forecasts based on snow surveys taken in the mountain ranges. Most water resources in the West are gained from snow melting in spring; consequently, surveying the amount of snow in winter gives farmers, ranchers, and resource planners valuable advance knowledge of how much water to expect in the spring and summer.

Obviously, the value of the water forecasts is limited by the comprehensiveness of the snow surveying. In the early years, when SCS surveyors traveled on snowshoes and skis, surveying was limited. Surveyors might get to a particular snow course only once a season—and some important snowpacks far too remote for a man to travel to on foot in winter were utterly inaccessible to the service

Realizing that improvement of the agency's snow survey system required the development of a reliable over-snow machine, SCS scientists launched an ambitious testing program to find one.

Utah State University allocated space and utilities for the establishment of a mechanical research laboratory for the research division of the Soil Conservation Service. Most of the SCS research was done under George T. Clyde, director of the Division of Irrigation Research. Ashton R. Codd, SCS snow survey supervisor in Montana, worked on the "Montana Sno-Bug." George Picker worked out of Colorado; Arch Work tested the Tucker Sno-Cat; and Gregory Pearson tested the Frandee Sno-Shu.

A good deal of work had already been done on snow machines when SCS began using them in the snow survey program. Still, the work was in what might be called the pioneering stage. For example, one early SCS test included the notation, "By judicious use of bailing wire and an old stove pipe borrowed out of a cabin, the damaged steering gear returned the machine safely to Medford. Gasoline consumption on this trip was ¼-gallon per mile."

The Tucker Sno-Cat was among the machines SCS finally decided to bank on. The Sno-Cat, like other machines SCS used in the 1950's, was large. SCS had worked on some lightweight models, but the heavy-duty machines were the only reliable ones for remote mountain areas.

When commercial recreation-sized vehicles became available about 1960, SCS was among the first of the buyers. The Service now uses some 125 snow machines in its snow surveying, including about 25 large machines.

"The snow survey program



snowmobiles to reach the snow measuring courses in the Lake Tahoe area on the California-Nevada border.

would never have gotten off the ground without the snow machines," said Pearson, now water supply forecast specialist in Portland, Oregon. "The machines allowed a great expansion into areas not previously surveyed and allowed the surveyors to travel to the same courses several times a year—so there was a lot more time to anticipate spring flood conditions. Snowmobiles made possible modern collection of data in those high, remote areas."

Impact on the environment

Ten years ago there were only a handful of snowmobiles, mechanical oddities useful for scientific research. Now there are millions of them, used almost exclusively for winter recreation.

Critics of the snowmobile believe that the intrusion of the machines into what had been a stronghold of nature has wreaked havoc with soils, plants, animals, and the environment in general. Not so, say the machines' defenders.

Erosion may be among the problems caused by snowmobiles. Lauren Long, SCS resource conservationist for Maine, suggests that since snowmobiles are used on land when the soil is protected by a cover of snow, erosion is light. "There is no gullying problem in northern New England—Vermont, New Hampshire, or Maine—due to snowmobiles," Long reports.

On the other hand, Assistant State Conservationist William Oemichen of Minnesota reports, "Where there's excessive use, snowmobiles can wear vegetation down and suppress or retard vegetative growth. The decreased cover can in turn increase erosion, particularly on slopes. Snowmobiling alongside the Minnesota River has caused some bank erosion. As far as I know, snowmobiles have not been causing serious erosion in Minnesota. Still, they can be a problem."

Disruption to wildlife may be a more serious concern. "Sometimes deer, fox, and coyote are harassed by snowmobiles,"

reports Michigan biologist Charles Smith. "On the Great Lakes, coyotes may use frozen shorelines for easy traveling. Sometimes snowmobilers can't resist the temptation to chase the animals, who can't get to cover."

Oemichen reports that harassment of foxes has been a problem in Minnesota; however, such harassment is illegal.

On the other hand, Long says that, "In New England you can't chase an animal because you have to stay on the trail. You can't drive a snowmobile through the woods. All an animal would have to do to avoid a snowmobiler would be to jump off the trail.

"In fact, snowmobile trails are beneficial—deer use them to move from one deer park to another in search of winter browse. There certainly is danger to deer if they are harassed. After being weakened by running, the deer can die of exposure or pneumonia; but coyotes can do the same thing to them."

Harassment need not be intentional. Andy Lennington, SCS area conservationist for northeastern Michigan, suggests that noise may also harm wildlife.

"Many environmentalists feel that noise has a detrimental effect on white-tailed deer and on our elk herd," he said. "We observed last fall that the white-tailed deer moved out of an area when the machines moved in. The deer holed up in a swamp where the machines can't go. What effect this will have on the deer population over the years is hard to predict."

People are also bothered by noisy snowmobiles. Smith reports that noise is a problem in southern Michigan, where some snowmobilers drive on frozen lakes at night. "Many lakes are ringed with cottages, and the reverberating noise keeps homeowners awake," he said.

"It's broken up the peace and tranquility of Michigan's North Country," according to Area Conservationist Lennington. "For example, snowmobiles now roam all over the Jordan Valley, even though the Jordan River is officially classified as a wild and scenic river. I've never had my snowmachine in Jordan Valley and I wouldn't consider it; I'd rather go in there on snowshoes or not at all. It's a beautiful area, and motorized vehicles should be restricted. These decisions may be made eventually, but the conflicts and problems are tremendous."

James Callison, project coordinator of the Northwest Michigan Resource Conservation and Development (RC&D) Project, suggests that snowmobiles are "a destructive thing if they get into a new pine plantation or a new apple or cherry orchard plantation." Smith adds that other vegetation and shrubbery are also trampled by the winter intruders.

In short, as Andy Lennington puts it, "If snowmobiles stay on the trails, there's no problem. But the machines certainly have the potential to be environmentally damaging."

Motorized over-snow equipment is used by SCS to reach snow courses but skis are also carried for emergencies.



Recreational benefits

By providing winter recreation in the snow country, the machines have found millions of fans.

"Snowmobiles get people outside in winter where they might otherwise spend 3 months sitting around a stove," says Lauren Long. "They're great family machines. Many rural people in Maine have snowmobiles and can't wait for winter to come. They really enjoy snowmobiling."

Resource conservation and development projects in several northern states have included activities to accommodate the demand for snowmobile trails and snowmobiling areas.

The Upper Peninsula RC&D Project in Michigan is inter-

ested in considering snowmobile trails. "We have not become involved with them yet," reports project coordinator Martin Kangas, "but we expect that we will be." Snowmobiling is one of the activities studied in the project's recently completed recreation potential inventories.

"SCS can advise on trail location through the Huron-Pines RC&D Project area," according to Lennington in Michigan. "The recreation inventory of the Huron-Pines RC&D recognizes the need for a better comprehensive trail plan, including considerations of erosion control."

"We're updating our recreation potential inventories throughout the project area," reports Northwest Michigan RC&D coordinator James Callison. "Generally two systems of trails are needed: one system to serve snowmobiles in winter and trail bikes in summer, and the other to serve cross-country skiing in winter and hiking in summer. These forms of recreation are definitely not compatible."

One of the first snowmobile trails SCS worked on was the Crow Wing Trail in Wadena County, Minnesota. The Crow Wing Trail was a project measure of the Wesmin RC&D Project, and was one of the first RC&D measures to be completed in the Nation.

Originally it was developed as a canoe trail. Later the area along the shore became a saddle trail in summer and a snowmobile trail in winter. SCS assisted in laying out the saddle-snowmobile trail and helped develop plans for individual campsites built by the campsite owners. Now SCS is working on campsite erosion control. The trail is about 50 miles long and crosses through most of the county. Efforts to extend the snowmobile trail even farther are being made under the leadership of the Wadena County Director of Parks.



Snowmobilers in Minnesota enjoy the Crow Wing Trail—one of the first Resource Conservation and Development Project measures completed.

The Wesmin RC&D Project is also working with the Minnesota Department of Natural Resources and local snowmobile clubs to develop another trail, the Glacial Lakes Snowmobile Trail.

At the request of the Arctic Cat Company, SCS assisted in developing a 10-mile trail in Pennington County, Minnesota. Another trail, to be called the Agassiz Basin Trail, is being planned. It would connect the Viking Trail to trails on Minnesota state forest land. If the Agassiz Basin Trail is developed, a snowmobiler could start at Thief River Falls, snowmobile through three counties, and wind up in Canada.

Assistant State Conservationist Oemichen sums up SCS work in Minnesota: "We've helped plan trails so that accelerated erosion can't occur. We've prevented erosion rather than coming in later to correct it. We've been involved in the initial planning, which is right where we should be."

Maine's Resource Conservationist Long agrees: "We have an obligation to assist in outdoor recreational enterprises on private land—and both landowners and the public can benefit from this major new form of recreation."

"Much more research will be necessary before the total environmental effects of snowmobiles can be fully assessed," SCS recreation specialist Ralph C. Wilson suggests, summing it all up. "However, it appears that the machines are here to stay, whether some people like them or not. In the meantime, SCS personnel, contributing the same kind of expertise which they bring to bear on other kinds of land use problems, can do much to help minimize the potential negative environmental impact of snowmobiles. This will require working closely with both the landowners and the snowmobiler, and a respect for both sides of the issue." ♦

Texas Project Focuses on Plants for Shoreline Erosion Control

by Arnold G. Davis and Arthur L. Bell
Plant materials specialist and conservation agronomist-watersheds, SCS, Temple, Texas

Wave erosion is a serious problem on floodwater retarding dams in Texas.

It has cost thousands of dollars in repairs and damaged more than 80 dams. When all planned structures are built, some 400 dams could be affected.

While rock riprap is used on the larger sites where available, the rock often must be hauled from great distances, increasing construction costs considerably.

Faced with this situation, in cooperation with the Texas soil and water conservation districts, the Soil Conservation Service began a special project in 1970 to assemble and study plants for tolerance to wave action.

Selected species were dug from native sites and transplanted to the shorelines of seven structures. Water-loving or water-tolerant plants were selected with strongly rhizomatous or extensive fiberous root systems. Preference was given to plants with tall, stiff canes or stems

A good cover of bermudagrass has not provided adequate protection from wave action on this dam near Howe, Texas.





Shoreline plantings made in 1970 at a pilot site near Trenton, Texas, protect the dam from wave action.

that could dissipate the wave energy against the face of the fill.

While bermudagrass is used as the base grass on most structures in the central and eastern parts of Texas and does a good job of controlling wave erosion on small dams, with prolonged pounding from large waves it often permits erosion.

The wind can blow in any direction with enough velocity to cause wave erosion on the face of a dam. In Texas, this is most apt to occur when lakes face north, west, or south. The type of soil on the front slope of an earthen dam is also a factor. SCS technicians believed that a plant or combination of plants could be developed which would better protect the front berm of the dam at the water line from wave bite erosion.

Since 1970, samples from the plants collected have been sent to the SCS plant materials center in Knox City, Texas. They are being studied there, and the better forms selected and increased for further evaluation on other structures.

Thirty-nine more dams have been planted with materials selected and grown at the center since 1970.

Among those plants that have proven well adapted for controlling wave erosion on these dams are common reedgrass, giant reedgrass, switchgrass, and prairie cordgrass.

Giant cutgrass and maidencane look promising in areas with a reliable source of water.

Some of the low-growing shrubs, such as indigobush and buttonbush, make good backup plants. They are also used by songbirds as nesting sites.

Improved strains of grasses have evolved at the plant center as a result of these early studies. A new switchgrass was selected because it starts growth early in spring, will tolerate flooding, and has late maturing seeds that are eaten by birds.

An improved common reedgrass and a prairie cordgrass were selected at the center for field evaluation in Oklahoma.

Similar studies are being conducted in Oklahoma and Kansas, and many of the plants will be used in several states. ♦

Erosion Control At Construction Sites: A Case Study

by Robert L. Bond

State resource conservationist, SCS, Harrisburg, Pennsylvania

To stop accelerated erosion at construction sites, the Commonwealth of Pennsylvania, like many other states, requires erosion and sedimentation control plans for all earthmoving activities.

Since many factors contribute to the amount of erosion and sedimentation on a given disturbed area, measures to control erosion may be unique to each site. Such factors include topography, kind of soil, amount of rainfall runoff, and vegetative cover.

Thus, while the Soil Conservation Service has national guidelines to minimize erosion and pollution on construction operations in which it is involved, the plans and specifications are developed for the specific measures required for each individual structure or site.

These plans must also meet other federal, state, and local requirements.

The SCS Engineering Design Unit in Harrisburg, for instance, prepared the erosion and sedimentation control plan for the Neshaminy Creek Watershed Site PA-620 in Bucks County incorporating the requirements of the Department of Environmental Resources as authorized by the Clean Streams Law. The final design for the structure was prepared by an engineering consulting firm in Harrisburg.

The erosion and sedimentation control plan contains maps showing topography, soils data, and other pertinent information to assure that adequate control facilities can be installed and the planned measures carried out.

For the Neshaminy site, the plan calls for staging of earthworks so that only the minimum area is exposed at any one time. Items are listed in the plan and controlled by the engineer. These include—

—stream crossings installed immediately after "move-in."

—sediment basins and settlement basins installed prior to any clearing or earthmoving operations.

—diversions, both permanent and temporary for the control of surface water, installed prior to clearing and grubbing and excavating for borrow areas and emergency spillways.

—borrow areas divided and cleared and grubbed or stripped only as needed. When portions of borrow areas have served their need, they are to be seeded immediately for permanent vegetative cover.

—trees within 10 feet of streams are not to be grubbed but cut flush with the ground except where grubbing is required under the dam and constructed channels. In borrow areas, all vegetation within 10 feet of streams is to be left undisturbed.

—disturbed areas that are idle for extended periods of time are to be mulched or tempo-

rarily seeded for erosion control.

—areas stripped of vegetation and not planned for immediate revegetation are to be left in a rough graded condition to increase infiltration and decrease runoff.

In addition to limiting the extent and duration of exposure, planned control measures and facilities include stream crossings, temporary and permanent diversions, temporary mulching and seeding, riprap, jute matting, sediment and settlement basins, and seeding and mulching for permanent vegetative cover.

Local sponsors are responsible for the operation and maintenance of the completed structure. The vegetative cover is maintained according to a plan which includes scheduled liming, fertilizing, and mowing to keep the structure and surrounding area functional and attractive. ♦



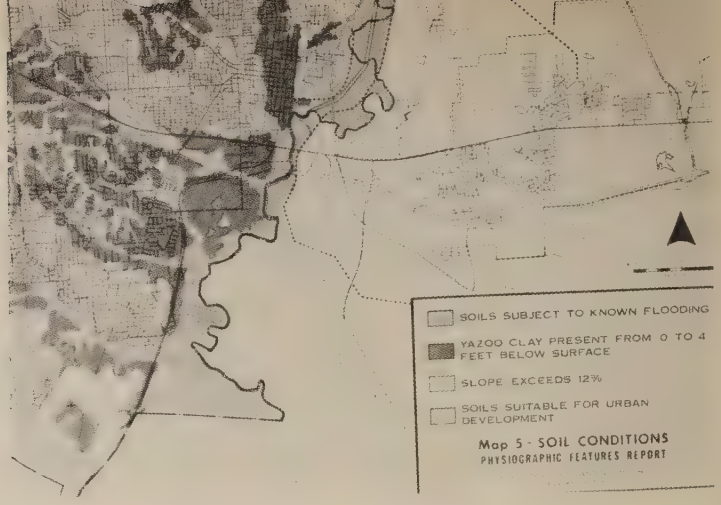


Above, a 'dormant' November seeding of tall fescue, redtop, and birdsfoot trefoil around a multipurpose dam provides excellent erosion control cover by the following summer. Below, grasses and legumes, established for erosion control and esthetic effects, are maintained by scheduled liming, fertilizing, and mowing.

Shifty Soils In Jackson

by W. M. Koos and W. A. Cole

Soil correlator and soil scientist,
SCS, Jackson, Mississippi



A computer map shows soils in Jackson, Mississippi.

Soil surveys, prepared by soil scientists of the Soil Conservation Service, formed a major part of the land use plan adopted by the Jackson, Mississippi, City Council last year.

Four broad soil groupings are illustrated on a computer map, the first of its kind produced in Mississippi.

Using these data, city planners can readily determine which soils are subject to flooding, which have erosion problems or high shrink-swell characteristics, and which are generally suitable for urban development.

"I don't believe city planners can get along without a soil map when planning urban development and future growth," Volney Cissna, Jackson's assistant planning director, said. This soil map could be a detail soil survey, or a general soil map, depending on the scope of the planning being done or it could be a computerized map like the one developed for the city of Jackson."

When Don Irvin, planning director for Jackson, contacted the Soil Conservation Service several years ago, he and his staff recognized that the city has at least three soil problems.

These are: (1) soils subject to flooding, (2) soils underlain with unstable clays which cause foundation cracks, and (3) erosion problems due to steep slopes.

The presence of a large geological formation of Yazoo clay in particular had distressed builders and landowners for years. Jackson is one of the major southern cities plagued with this shifting soil.

The city's detailed information about soils should help developers avoid these problems, or compensate for them.

The soils interpretative work was done under a cost-share agreement between the Soil Conservation Service and the Jackson Planning Board. In all, 75,000 acres were surveyed on aerial photographs of a scale of 1:15840. Soils were checked on vacant lots, open areas, and along utility lines. A schematic type soil survey was made of the present urban areas. A detail soil survey was made of the remaining areas.

Soil scientists and city planners decided four broad groupings were needed for adequate land use planning.

To develop a map with the four groupings, the planning staff developed a two-dimensional matrix that measures characteristics of common points on two or more grids. Tabulation of results was done on the city of Jackson's computer, which then printed the three-color soil map.

Of the four groupings on the map, the first shows soils subject to flooding. They are poorly-to-well-drained alluvial soils.

Areas with underlying Yazoo clay formation present from 0 to 4 feet below the surface make up the second grouping. This clay has a high shrink-swell characteristic which makes it particularly unsuitable for light construction purposes.

The third grouping is land with a slope which exceeds 12 percent. Soil erosion problems on slopes in excess of 12 percent are generally severe.

The fourth grouping is soils that have characteristics generally suitable for urban development.

This work with the city planning director has led to the signing of a cooperative agreement in land use planning between the Hinds County Soil and Water Conservation District and the Jackson Planning Board, opening up the way for a real conservation effort in this area. ♦

Recon...

Soil probe and swimming pools. The *Washington Missourian* reports a new use for the probe used by SCS to take soil samples. A photograph in the weekly paper which covers Franklin County, Missouri, shows District Conservationist Leonard A. Knoernschild and the city's Park and Recreation Director taking samples of sand in the municipal pool filters. Use of the probe proved to be a quick method of determining if the sand filter is functioning properly. The small sand particles necessary to the filtering process, with use, clump together, forming large aggregates. The clumping significantly reduces the filter effectiveness. The technician using the soil probe can quickly inspect the filter and determine when new sand is needed.

Sagebrush comes in at least seven flavors. Two range ecologists at Oregon State University, using sheep and deer to test the tastiness of half of Oregon's 14 woody sagebrush varieties, found that the animals preferred Foothill big sagebrush, an unnamed subspecies which one of the ecologists, A. H. Winward, discovered growing throughout parts of Oregon, Idaho, and California. To set up the "taste test," Winward and Dennis Sheehy dug up 476 plants at several locations and trucked them to the Corvallis area. Sheehy counted each leaf and branch of new growth on the potted plants and recounted leaves and branches after each feeding period. Why was one flavor of sagebrush chosen over another? "We're not sure at this point," Winward said in *Oregon's Agricultural Progress*, a quarterly research report published by the Oregon Agricultural Experiment Station. "Apparently animals use smell more than sight to select varieties they prefer. Essential oils give the smell to the plant. We have found that the amount and kind of oil vary with each sagebrush variety. All varieties of sagebrush have their own smell and probably, their own taste." Still unknown is which sagebrush plant cattle prefer. It is a study which sagebrush experts Winward and Sheehy would like to investigate, too.

Earth Week

Earth Week 1975, April 20 to 26, will be a time of "Renewal" according to the Alliance for Environmental Education which sponsors the annual conservation week.

Each of the 27 Alliance affiliates will feature special projects to call attention to Earth Week as a timely reminder of the need for renewed efforts in conservation.

Scouting Environmental Day is set for April 26 when Boy Scouts throughout the Nation will plan special observances in honor of Earth Renewal Week.

Among the sponsoring organizations that will participate in Earth Week '75 are the National Association of Conservation Districts, the Soil Conservation Society of America, Conservation Education Association, and the National Wildlife Federation.

For further information, write Information Division, Soil Conservation Service, USDA, Washington, D.C. 20250.

Speaking Spanish. SCS's Technical Service Center in Fort Worth has prepared conservation messages in Spanish for use by radio and television stations in the South.

The material is aimed primarily at Spanish-speaking audiences in Texas, Florida, and New Mexico. San Antonio, with a Spanish-speaking population of 300,000, has a television station which broadcasts fulltime in Spanish and is picked up on 29 CATV stations.

In addition to public service announcements, the center has prepared slide-talk scripts and other conservation material in Spanish and has started a Spanish-English glossary on conservation terms.

Review

Grassland of the United States. A Symposium of the American Forage and Grassland Council. Edited by Howard B. Sprague. *1974. Iowa State University Press, Ames, Iowa. 220 pp., illus. $7.50.*

This book deals with the ecologic and economic importance of grassland and forage in the 48 conterminous states. It was sponsored by the American Forage and Grassland Council and brings together an up-to-date compilation of information not previously available in a single document.

Several disciplines and a broad range of expertise and experience in forage and grassland management and related fields are represented in the 18 chapters, each under separate authorship. The 24 authors include scientists from a number of universities and governmental agencies.

The importance, extent, and location of all grazing lands are discussed, including privately owned, national forests and national grasslands, and the public domain. The importance of grassland and forage in various regions of the country including the Great Plains, the Northeast, the North Central States, the Middle States, and the South are covered in individual chapters.

Four chapters deal with livestock, outlining the importance of grassland and forage to the livestock industry. One chapter covers the preservation of grassland products for ruminant feeding.

A unique feature of the book is four chapters detailing the use of grasslands other than for livestock production. Topics covered include: water resources; wildlife and game management; pollution control; and beauty, recreation, and other special purposes.

Thirty-four excellent photographs illustrate the many kinds of grasslands and their varied uses.

This book should prove to be a useful reference for many people concerned with the use and management of grasslands. It contains an excellent compilation of grassland and forage information.—**Thomas N. Shiflet,** *chief range conservationist, SCS, Washington, D.C.*

New publications

Root Anatomy and Morphology: A Guide to the Literature. By Robert H. Miller. *1974. Shoe String Press, Inc., Hamden, Conn. 06514, ISBN-208-01452-7. 271 pp. $11.50.* This unannotated bibliography by Dr. Miller, National Program Staff scientist with USDA's Agricultural Research Service, is a working reference that should be valuable to plant researchers. Arranged both chronologically and alphabetically by author, the reference contains 2,974 cross references to indices of 875 plant genera and 240 families and provides full periodical reference titles and their abbreviations. Literature cited covers from prior to 1900 to the present.

Soil surveys

Colorado

Castle Rock Area. By Lynn S. Larsen. 1974. Soil Conservation Service in cooperation with Colorado Agricultural Experiment Station. 124 pp., illus.; maps.

Indiana

Daviess County. By Leo A. Kelly. 1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 85 pp., illus.; maps.

Kansas

Butler County. By Harold L. Penner, Sylvester C. Ekart, Donald A. Ewing, Gordon Schmidt, and Jimmie Smith. 1975. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 60 pp., illus.; maps.

Nebraska

Logan County. By Merritt A. Plantz and Lester E. Sherfey. 1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 70 pp., illus.; maps.

Texas

Martin County. By Herbert R. Stoner and Marvin L. Dixon. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 54 pp., illus.; maps.

Meetings

SCSA Schedules 'Land Use' for August Meeting

"Land Use: Food and Living" will be the theme of the 30th annual meeting of the Soil Conservation Society of America, August 10-13, in San Antonio, Texas.

Topics scheduled for the sessions include the land use implications of meeting domestic and foreign food demands and the impacts that expanded agricultural production will have on the Nation's soil and water and other natural resources.

Edward E. Thomas, state conservationist for the Soil Conservation Service in Texas, is program chairman for the meeting.

'More Than Dams' Is Topic of National Watershed Congress

"More Than Dams: Land Treatment and Non-Structural Measures" is the theme for the 22nd National Watershed Congress to be held June 1-4 at the Hilton Hotel in Portland, Oregon.

Sessions will focus on the extent to which conservation measures have been applied for the management and protection of farm and forest land within upstream watershed projects.

More than 30 leading agricultural, conservation, and industrial organizations sponsor the Congress, which acts as a forum for the discussion of improving natural resources management and use on a watershed basis.

April

2–4	*Thirteenth Annual Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho*
6–11	*American Chemical Society, Philadelphia, Pa.*
8–11	*Hardwood Plywood Manufacturers Association, San Diego, Calif.*
9–12	*American Camping Association Western Region Convention, Pacific Grove, Calif.*
12–17	*American Society of Planning Officials, Vancouver, British Columbia*
13–16	*National Water Safety Congress, Milwaukee, Wisc.*
14	*Friends of the Earth, New York, N.Y.*
17–21	*National Audubon Society, New Orleans, La.*
20–23	*Association of American Geographers, Milwaukee, Wisc.*
21–23	*National Academy of Sciences, Washington, D.C.*
21–24	*International Symposium on Livestock Wastes, Urbana-Champaign, Ill.*
21–25	*American Geophysical Union, Washington, D.C.*
21–25	*Annual Western Snow Conference, San Diego, Calif.*
26	*Nature Conservancy, Washington, D.C.*
27–29	*Sixty-third Annual Meeting Chamber of Commerce of the United States, Washington, D.C.*
27–May 1	*National Association for Community Development, Portland, Ore.*
28–May 1	*Garden Club of America, Washington, D.C.*

May

4–7	*National Forest Products Association, Washington, D.C.*
15–16	*Southern Forest Institute, Inc., Panama City, Fla.*
18–22	*American Institute of Architects, Atlanta, Ga.*
18–23	*National Council of State Garden Clubs, Inc., Salt Lake City, Utah*
20–23	*International Association on Great Lakes Research, Albany, N.Y.*
29–30	*Southern Forest Institute, Inc., Biloxi, Miss.*

June

1–4	*Twenty-second National Watershed Congress, Portland, Ore.*
8–12	*General Federation of Women's Clubs, Washington, D.C.*
8–13	*American Water Works Association, Minneapolis, Minn.*
15–19	*Air Pollution Control Association, Boston, Mass.*
16–20	*American Geophysical Union, Washington, D.C.*
18–20	*Twelfth National Agricultural Plastics Conference, Atlantic City, N.J.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / April 1975

1.6
So3S Reserve
CORE LIST



U.S. DEPT. OF AGRICULTURE
NATL. AGRIC. LIBRARY
RECEIVED
MAY 2 '75
PROCUREMENT SECTION
CURRENT SERIAL RECORDS

From the Administrator

New Opportunities for Women

In support of International Women's Year 1975 and the Federal Women's Program, the Soil Conservation Service has redoubled efforts to employ and promote women to jobs of responsibility in all areas of our work.

As 1974 ended, a total of 43 women were holding jobs in professional fields in the Service that used to be held exclusively by men. While the number is not yet large, it is twice what it was a year ago, and that is a sign of genuine progress.

SCS women in professional jobs include an urban planner, a landscape architect, engineers, soil scientists, soil conservationists, economists, cartographers, accountants, and an operations researcher.

In addition, we currently have 28 student trainees who are women. They are working in the fields of soil conservation, soil science, and engineering.

In the administrative field, two SCS firsts for women include an assistant state administrative officer and a state budget and finance officer.

The number of women serving as public information specialists and officers in SCS state offices also has taken a jump—from 1 to 10 in less than 5 years.

But SCS will not be content with these modest gains. We intend to see women advance into the mainstream of SCS positions.

One way we hope to accomplish this is through the Upward Mobility Program, a tool for moving women from clerical and secretarial jobs to paraprofessional positions. This program now includes a college study program, on-the-job training opportunities, and adjusted tours of duty to permit attendance at local universities. We are doing our best to publicize these opportunities among employees, but women also have a responsibility—to avail themselves of opportunities as they arise.

Helping to spread the word about opportunities in SCS through workshops and career counseling is the Federal Women's Program Coordinator selected in each SCS state office and in the Washington office.

Other SCS actions in support of broader opportunities for women include—

- Holding week-long courses at SCS training centers on "Women in Federal Service." About one-fourth of the students so far have been men, since they also need to understand the changing role of women in government.
- Encouraging more and more colleges and universities to expand or improve their curricula to enable more women and minority students to qualify for SCS positions.
- Providing a series of conservation orientation tours for employees, primarily women, who work in the Washington, D.C., office and get little opportunity to see the way we work in the field.

These are some of the things we are doing to get more high-quality women employees into the Service and to give them continuing opportunities for advancement after they join us. That objective has our full commitment in the years ahead.

Kenneth E. Grant

SOIL conservation

Contents

2 From the Administrator

4 'One of the Last Frontiers of the East'
Vincent J. Price

7 Halifax Maidencane—A Plant to Protect Shorelines
T. A. Brown

8 'Sleeping Giant' for Spencer
Freddie L. Fields

10 Conservation With LTA's in Iowa
Bill Willis

12 IPA = Imaginative, Practical Assistance
Verlon K. Vrana

16 Shoreline Erosion Inventory in North Carolina
Stanton Harrell

18 The Poisoned Cattle of Willow Creek
Joe Kubota

21 In the Spring of 1935 . . .

22 Recon . . .

22 Soil Surveys

23 Meetings

April 1975, Vol. 40, No. 9

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in transaction of public business required by law of this Department. Use of funds for printing **Soil Conservation** has been approved by the Director of the Office of Management and Budget through July 31, 1978.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission
Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names
Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions
$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

COVER: This month's cover is a special one—it was the first cover of **Soil Conservation** magazine 40 years ago. The Soil Conservation Service marks its 40th anniversary on April 27—the date on which the legislation passed by the 74th Congress became Public Law 46—"To provide for the protection of land resources against soil erosion, and for other purposes." See story on page 21.



Sucker Brook is one of the areas recommended for a pilot agricultural drainage and flood control project in a river basin report prepared by the St. Lawrence River Regional Water Resources Planning Board.

'One of the Last Frontiers of the East'

by Vincent J. Price
Information Division, SCS, Washington, D.C.

With the American farmer pressed to meet increasing U.S. and world demand for food and fiber, discovery of a previously overlooked region with prime agricultural potential is undoubtedly a find of great importance. U.S. Department of Agriculture and New York Department of Environmental Conservation people have located just such a region. Its potential was discovered through a river basin study of upstate New York.

For hundreds of years farmers in the St. Lawrence River Valley of New York agreed: the land there was practically worthless for farming. The season was too short; the soil too poor; the land too wet; and the climate too cold. For 150 years farmers from the Mohawk Valley and the Hudson moved west, settling in Ohio and Wisconsin, in the Prairie and the Great Plains. The St. Lawrence Valley, separated from the rest of the country by the forested Adirondack Mountains, remained in low intensity dairying and woodland.

Then in the 1960's, a combination of factors began to make people take another long close look at the land resources of the St. Lawrence. Instrumental in the process was a USDA Type IV river basin study undertaken under Section 6, Public Law 566.

This study was part of the Eastern New York River Basin Survey, which in turn is part of a cooperative federal-state program to inventory land and water resources throughout New York State. The studies are coordinated by the New York State Department of Environmental Conservation.

USDA assistance from the Soil Conservation Service, Forest Service, and Economic Research Service includes analyses of those individual watersheds which have potential for development of their water and related land resources.

"We write brief reports with

specific technical information referring to the watersheds," explains SCS's watershed planning party leader for New York, Eudell F. Bivens.

"People can relate to their own watersheds sometimes while they can't relate to the Oswego or the Susquehanna river basin—vast basins such as these are too large compared to the geographic interests of an individual citizen.

"For the St. Lawrence study, we went in with a contingent of men for every possible discipline in which we have technical expertise. After about a week, we identified potential problems. We made detailed studies, called watershed investigation reports (WIR's), of typical watersheds for flooding, drainage, and other problems."

What the specialists found surprised them.

"The North Country is one of the last frontiers of the East, one of the last areas with large acreages of open country readily available for farming," reports SCS District Conservationist Dave Stockbridge. "The watersheds studied here under the river basin survey have high agricultural potential, but due to poorly drained conditions, the land is used only for low intensity farming, with low profits."

Although there are extensive wetlands in the basin, none of the land under consideration is permanently under water. It is inundated in the spring, in the fall, and after rainstorms in the growing season. Because of the spring inundation, the growing season is drastically reduced, simply because farm machinery can't operate in the mud and the soil can't warm up.

"The county is abundant in clays and silty clay soils of high natural fertility," says Stockbridge, "but removal of surface water is necessary before you can produce anything more than grass."

For example, one of the watersheds studied was Squeak Brook. SCS found that if the lands with high agricultural potential in the Squeak Brook Watershed were drained and protected from flooding, an average acre could yield 100 bushels of grain corn, 17,000-17,500 pounds of potatoes, 1.4 tons of snap beans, 19.5 tons of processed beets, 454 crates of cauliflower (each crate containing 12 heads), 2.8 tons of processed sweet corn, 25 tons of processed cabbage, 165 bushels of cucumbers, 2.5 tons of processed peas, or 8.2 tons of processed spinach.

"Compared with the $2.17 net return per acre currently being realized" in the watershed, the Squeak Brook WIR reports, "the benefits of the project vary from around $10 per acre for present land use with only drainage improvement and flood control as inputs to more than $100 per acre for using the suitable protected land for potatoes."

The question could be raised, if the land is so good, why hasn't any farmer already drained it? The answer is that the streams of the basin slowly drain into the St. Lawrence River, and until a watershed as a whole unites to create a common outlet for its drainage, conventional on-farm drainage may not be adequate to assure a successful crop.

"In northern New York, the land is all in little pockets," explains Dr. Madison Wright, dean of the College of Agriculture and Life Sciences at Cornell University. "If an individual feels like making an improvement, he may not have an outlet. If his neighbor doesn't also want to solve the problem or provide an outlet, his efforts are wasted."

Before the land—an estimated 200,000 to 800,000 acres—could be safely utilized, coordinated drainage projects would have to be carried out, and hard choices between conflicting land uses may have to be made.

Bob Thompson is a farmer on the Sucker Brook Watershed in St. Lawrence County. He's installed some drainage on his farm but he still lacks an adequate outlet.

"Of the 200 acres on my farm, 10 to 20 percent didn't need drainage," he reports. "Eighty to 90 percent needed drainage before we could be sure of getting a crop, and it's not all done yet. I'd like to put corn into one area, but it's poorly drained.

"We had places where in June you'd walk in water halfway up to your knees. We take a tractor out and get stuck; we take a second tractor out to get the first one and almost get stuck again. There's a field next door where nothing's been done and there's some water on it now, in mid-June.

"This creek, Sucker Brook, supposedly drains into the St. Lawrence, but it really sits full of water all summer. In spite of all the hot weather, this creek will never get lower. For that reason, if it rains, the drainage ditches all fill up with water.

"Right now we try to produce all our own roughage. In the future, we hope to also produce our feed grain. If we can get corn in the first of May instead of the 20th, it'll mature; we could grow it for grain instead of for silage.

"The problems are the same all over here. There are probably a dozen or so of us that would be affected if we could get a watershed plan imple-

mented. It's high potash soil here; it's high lime soil; and if we can get the water off of it, we'll get real good use out of it."

It was the river basin survey which brought the complex situation in the North Country to light.

"No one knew anything about the resources there," explains SCS's Bivens. "No one had really explored the possibilities of drainage on a sand-over-clay or a clay-over-sand soil. We chose three farms with typical soils: clay, clay over sand, and sand over clay, and then developed a detailed water management plan for each of these farms. We explained in dollars and cents what a farmer could get from drainage and what drainage would cost."

The St. Lawrence River Regional Water Resources Planning Board, in preparing the river basin report, recommended that pilot agricultural drainage and flood control projects be undertaken in the basin, naming Squeak Brook, Sucker Brook, and the Naumberg area as three possible watersheds for such a project.

"The local soil and water conservation districts should make application through the newly established Black-St. Lawrence Resource Conservation and Development Project," the river basin report recommended. "The Cooperative Extension Service and the Cornell College of Agriculture and Life Sciences should be requested to help the district organize the landowners and support the project. The state and county should share the nonfederal cost."

Whether such a pilot project will be undertaken remains to be seen, but according to Dr. F. N. Swader of Cornell, it would be the logical next step.

"We're working for that end," he said. "This should involve both installation of the project and documentation of the changes that take place. We feel that documentation of the changes would make it of maximum utility."

The existence of valuable wildlife resources will make a land use decision even more difficult.

"We have extensive acreages of Class III, IV, and V wetlands," Stockbridge said. "We're in the principal Eastern flyway for waterfowl. It should be emphasized that there is a big difference between wet land and wetlands—we're in no way talking about draining wetlands." There are also valuable recreation areas in the basin, including large areas in the Adirondack State Park.

S. K. Wright, assistant executive secretary of the New York State Soil and Water Committee, agrees.

"We're talking about enhancement of present land use, not wetland development," he said, but suggests that the land use conflicts will still be there.

"You're talking about channelization vs. fish and wildlife development, about agricultural drainage in an area with tremendous agricultural potential—there are no easy answers. We need first to gather the kinds of information on a river basin that are essential to make decisions on water management."

Bivens cautions that even drainage of agricultural lands could have very significant environmental impacts on adjacent or nearby wildlife areas. "There's a tremendous amount of wildlife acreage up there and the environmental aspects of drainage will have to be worked out before you decide to go ahead and enhance the farmlands," he said.

But at least, whatever land use decisions are made in the St. Lawrence Basin will be made from a knowledgeable standpoint. "The levels of water resource understanding jumped tremendously as a result of the river basin survey," reports Wright. "Helping local leaders understand the problems was a main benefit of river basin surveys in New York."

Factors which support favorable consideration for more intensive agricultural development include the spotted distribution of the areas favorable for crop production. No large areas should be drained. The edge effects created by different land uses and the increased food production for wildlife would tend to counterbalance any damage to adjacent wildlife lands which might occur. In any case, any potential development would be planned to result in minimum adverse impacts on adjacent wetlands dedicated to wildlife use.

In the future, the information generated by the river basin survey of this agricultural frontier may have a significant effect on America's continuing role as the foremost world farmer.

"The competition for land from urban uses continually enhances the North Country," said Henry Wadsworth, associate director of Extension Service at Cornell. "The U.S. posture in respect to world food will also affect the prospects for the North Country. If a lot of our production in the Midwest goes for export, a lot of our North Country agricultural potential will have to be met."

For the present, the myth of the worthless North Country has been dispelled. ♦

Halifax Maidencane— A Plant To Protect Shorelines

by T. A. Bown

Plant materials specialist, SCS, Jackson, Mississippi

An aquatic grass, Halifax maidencane is successfully controlling shoreline erosion on ponds, lakes, and irrigation reservoirs in Arkansas, Louisiana, and Mississippi and should be climatically adapted to all of the Southeast.

The plant was released for erosion control last year by the Mississippi Agricultural and Forestry Experiment Station and the Soil Conservation Service.

Studied at SCS's plant materials center in Coffeeville, Mississippi, over the last 10 years along with many other grasses, forbs, and shrubs for shoreline erosion control, Halifax maidencane appears to be the best plant for this job. It was originally collected south of Halifax, North Carolina, by former SCS plant materials specialist Karl E. Graetz.

Maidencane, *Panicum hemitomon,* is a native grass that grows from North Carolina south to Florida and west to Tennessee and around the Gulf Coast to Texas. Of the many ecotypes of this grass, Halifax maidencane was selected for shoreline planting because of its vigorous spreading habit and its tolerance to cold.

Among its other assets, Halifax maidencane grows across the waterline. It will grow at least 18 inches below the normal waterline and up the bank to about 36 inches above it. The plant is well adapted to lakes that have moderate water level fluctuation.

Because maidencane is extremely palatable, grazing animals must be closely managed or excluded to keep a heavy grass cover along the shoreline during the stormy season.

The shoreline above the maidencane must also be protected with a good vegetative cover, such as Pangburn switchgrass, bermudagrass, bahiagrass, or tall fescue. ♦



Halifax maidencane helps control erosion along the shoreline of this lake in northern Mississippi.

'Sleeping Giant' for Spencer

by Freddie L. Fields

District conservationist, SCS, Spencer, West Virginia

A city that has run short of water many times in recent years, Spencer, West Virginia, now has a "sleeping giant" ready to provide a reservoir of water and protect downstream areas from floods.

The "sleeping giant" is a recently completed dam built as a result of the Little Kanawha Resource Conservation and Development Project (RC&D). Construction of the dam was adopted as a measure by the sponsors of the RC&D project in west central West Virginia.

Earlier this year, the lake, filled with 500 million gallons of water, began flowing through the principal pipe spillway to the new water pickup station downstream. The 70 surface acres of water stored behind the 87-foot-high dam guarantee a year-round water supply to Spencer.

At present, Spencer provides water to nearly 1,200 individual customers, 153 commercial concerns, 3 industrial plants, and 20 public authorities. One new customer as a result of the new dam will be the Spencer State Hospital.

City officials expect future water needs will reach 1 million gallons per day compared with the current level of 600,000 gallons.

Rapid residential and industrial growth in the Spencer area had severely taxed the city's water supply in recent years. Dependent on two Mile Tree dams—with a capacity of 58 million gallons, the city frequently had to take emergency actions to conserve water.

The first work to locate a new water supply began about 10 years ago. The Soil Conservation Service, under Public Law 566, studied a number of potential dam sites in the upstream area for both flood control and water storage. The

The Charles Fork Dam near Spencer, West Virginia, begins to fill.

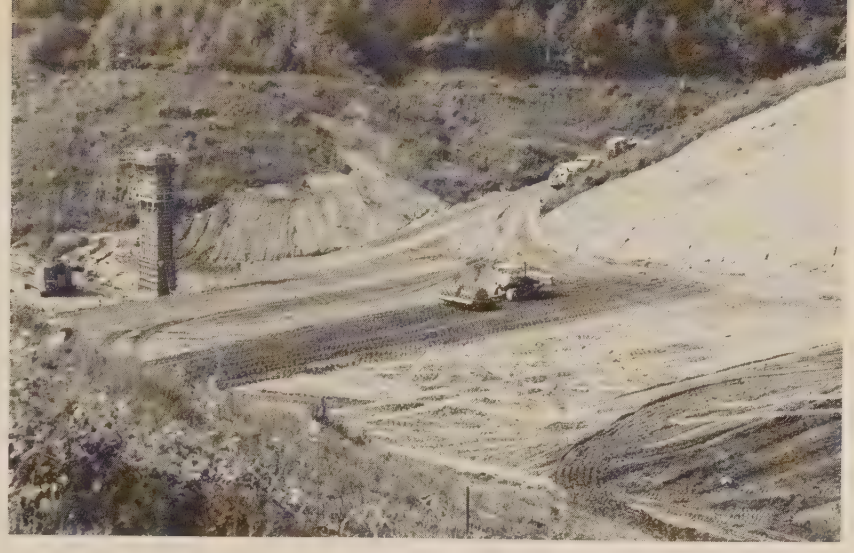


study focused upstream from Spencer in the upper reaches of the Spring Creek watershed. This area was the source of periodic floodwaters which inundated the lowlands, including residential sections of the city.

The eventual site of the dam on Charles Fork, a tributary of Spring Creek, met the city's needs for water storage and contributed to flood protection. It was close to Spencer and had relatively few families in the area, simplifying relocation problems.

The Economic Development Administration, U.S. Department of Commerce, financed the project, and the Soil Conservation Service RC&D, under its technical assistance program, reviewed the plans and provided inspection during construction. The dam was completed and began storing water in June 1974.

Additional financing was provided by the Economic Development Administration for the city to upgrade its water treatment, storage, and distribution facilities and also to buy the Spencer waterworks from the West Virginia Water Company. ♦





Above, at left, is the riser which now serves as the principal pipe outlet for the dam. Below, workmen spray a mixture of grass and legume seeds and water following construction.

Flooding such as this will be reduced by the dam, which will hold back flood water and release it gradually downstream.



'Midnight Oil Burned'

Conservation With LTA's in Iowa

by Bill Willis

District conservationist, SCS, Atlantic, Iowa

New concepts or programs can be tough to get started, but they're much easier if you've got excellent cooperation, a forward-looking public, and you're willing to put forth some extra effort.

We found that to be the case with the new long-term cost-sharing agreement program last year. Forty-three landowners in Cass County wanted to sign long-term agreements (LTA's) after they understood how the program could help protect their rolling hills from erosion. This was the highest figure of any county in Iowa.

A hastily organized publicity program announced the new approach to applying the complete conservation package through LTA's. Paul Peterson, county executive director for the Agricultural Stabilization and Conservation Service (ASCS) in Atlantic, devoted a paragraph to the LTA's in a newsletter. We then organized a brief afternoon meeting to explain the program to a dozen landowners who had demonstrated active interest in conservation work. From there, the word spread at sale barns, coffee shops, across fences, and otherwise "by word of mouth."

April was designated as the sign-up period. A few applications became several and soon became dozens. April was also corn planting time in Cass County, so midnight oil burned in the USDA offices for many nights while 43 farmers identified their conservation needs.

Placing priorities on 43 applications is a tremendous job. After many hours of Soil Conservation Service time in setting priorities, the ASCS County Committee spent considerable time establishing the order for processing the requests. Eight Conservation Plans of Operation (CPO) were prepared and signed as agreements, using the available cost-share funds.

The eight CPO's, when completed, will result in eight erosion control structures, 12 acres of grassed waterways, and 161 acres permanently converted to improved pasture. More than 21 miles of terraces will be built, most of which will have grassed backslopes and tile outlets. Conservation tillage practices will be carried out on nearly 900 acres of cropland. A total of 1,185 acres of cropland will be protected to within allowable soil losses on these eight farms. Wildlife needs were also included by insuring that 22 acres of food and cover areas would be established, protected, or maintained.

The combination of land use and treatment decisions determine how much work must be done. One plan was prepared on a 160-acre pasture farm that needs some reseeding and a change in the management system. This farm needs about $8,000 total investment in erosion control practices. Some other farms, where intensive use of cropland is planned, need nearly $20,000 in cost-share money alone.

The Cass County Soil Conservation District (SCD) and the local ASCS office have supported the use of the long-term agreements.

"We have pledged to supplement the ASCS program by picking up 25 percent of the cost of practices on LTA's without state cost-share funds," according to George Hosfelt, chairman of the Cass County SCD.

"We'll do this as long as we have the money because we feel LTA's are a good way of getting the complete job done."

The State of Iowa, through the Department of Soil Conservation, has appropriated cost-share funds for conservation work for the last 2 years.

"We will need about $90,000 in cost-share funds through this office over the next 8 years to carry out our responsibility," Peterson said. "Our longest contract will run the full 10 years that we are allowed."

Royce Kitelinger, a young farmer operating 200 acres of

his own and renting additional cropland, comments on his LTA by saying: "It works out well to set up a farm as a whole for a conservation system."

Another young farmer who has entered into an LTA is Jerry McCrory. He operates two tracts of his own land near the town of Cumberland as well as his father's farm and does custom work. McCrory considers the welfare of future farmers important. "We've only got one soil, and we've got to save it for future generations. We can't grow soil like we grow a corn crop."

People matched with conservation practices, technical know-how linked with some financial assistance, and long-term agreements are the essential ingredients to produce the complete conservation package. ♦

More than 21 miles of terraces will be built in Cass County through LTA's signed last year.



IPA=Imaginative, F

by Verlon K. Vrana
Director, Personnel Div

More than ever before, the Soil Conservation Service is working with and assisting state and local units of government. Much of this assistance is done under a new tool in public administration, the Intergovernmental Personnel Act, or IPA.

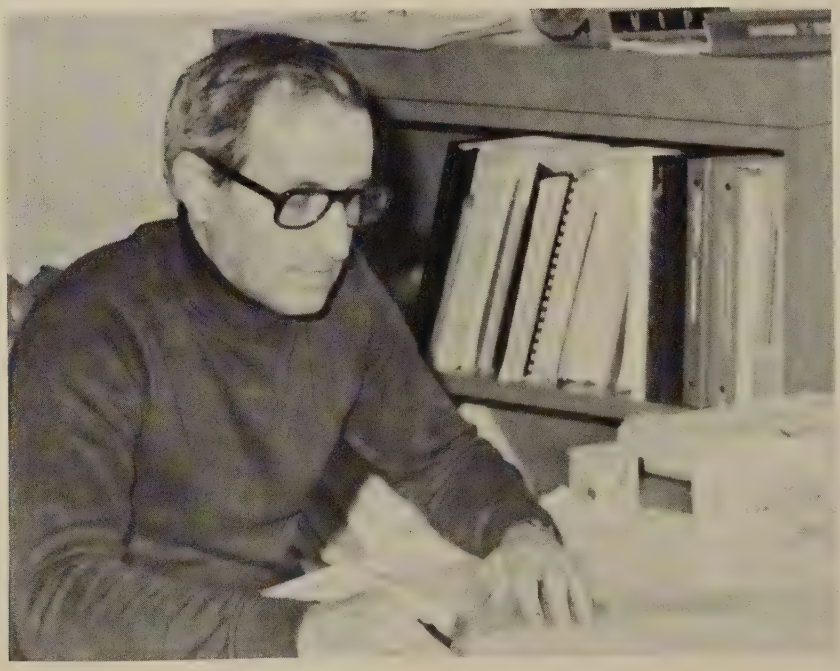
The IPA, enacted by Congress in 1970, enables federal employees to be detailed temporarily to universities and state and local governments and specifies conditions under which nonfederal personnel may be detailed to federal agencies. Salary costs are shared, in many cases on a 50-50 basis.

To date, SCS has assigned more employees to work under the IPA than any other agency in the U.S. Department of Agriculture. Thirty-two states and two technical service centers have participated in the 154 assignments made by SCS since the start of the program. Several states have had seven or more assignments, including California, Florida, Idaho, New Mexico, New York, North Carolina, Pennsylvania, South Dakota, Virginia, and West Virginia.

Overall, more than 1,500 federal employees have received IPA assignments. USDA has led all other federal agencies, with a total of 260 employees working or having worked under the IPA. The length of IPA assignments varies, although it usually does not exceed 2 years.

SCS employees who have participated in this work represent many disciplines, including engineering, soil science, soil conservation, economics, geology, biology, and range conservation, agronomy, and other plant sciences.

Assignments are quite varied. For example, in California 10 SCS employees are working for other units of government under the act. One, an engineer, is advising the California State Water Quality Control Board on technical problems of agricultural pollution. A plant materials specialist, assigned to the California Division of Highways, is investigating plant materials for use on various state highway projects. And a soil conservationist is serving as an assistant regional director of the Santa Barbara Region, California Coastal Zone



SCS's Raymond Diedrick was on IPA assignment to the Twin Cities Metropolitan Council.

iactical Assistance

. SCS, Washington, D.C.

Commission, to help develop a regional land use plan for the South Central Coast.

For the SCS employee assigned to another level of government, the work is often difficult. Goals and procedures are often hard to understand at first. A soil scientist or conservationist may find that everyone around him is really a layman when it comes to soil science or conservation—and may discover that *he's* really a layman when it comes to public health, transportation, or urban planning!

But if IPA work is challenging, it's also rewarding and may result in invaluable assistance to a state or a region. For example:

The *Montana Department of State Lands (DSL)* needed top professional help when it was directed by the state legislature to review reclamation plans submitted by mining companies and then approve mining operations.

The Department turned to SCS via the IPA. An SCS plant materials specialist, Ashley Thornburg, was detailed to the Department for 15 months on a part-time basis. Another SCS plant materials specialist, James A. Olsen, was also detailed to the Department.

Besides accelerating the rate at which the Department could approve the plans and projects of mining companies, these two IPA assignments improved SCS-DSL relations. Theodore Schwinden, Montana Commissioner of State Lands, sees a benefit to both agencies. "The entire field of reclamation in the West is brand-new," he said, "Both Mr. Thornburg and Mr. Olsen assisted us immensely in developing our program. On the federal side, as the federal government moves more toward programs in strip-mine reclamation, these men will have already had practical experience in existing state programs like our own."

The Twin Cities Metropolitan Council is a regional commission developing a comprehensive plan for the seven county Minneapolis-St. Paul region of Minnesota. "We needed short-term, very technical help in relating soils to urban development," explained the council's Director of Environmental Planning, Frank Lamm.

Under the IPA, SCS assigned



Richard H. Gilbert, SCS soil scientist, works at Purdue University's Laboratory on Application of Remote Sensing.



In Montana, James A. Olsen, plant materials specialist for SCS, works for the Montana Department of State Lands in reviewing reclamation plans.

soils expert Raymond Diedrick to work for the Metropolitan Council. Diedrick reviewed all available technical soils information and then prepared a soils guide that could be understood by planners and developers. He also applied his soils expertise in reviewing project plans and referrals from towns in the region.

In addition, he prepared several other guides and maps relating soils to land use. Lamm noted particularly that Diedrick developed a sewage disposal/soils analysis that has been extremely helpful to the staff in understanding what kinds of soils can result in septic tank problems and why.

Purdue University's Laboratory on Application of Remote Sensing secured the services of SCS soil scientist Richard H. Gilbert as manager for a National Aeronautics and Space Administration grant project to deliver remote sensing satellite data to user agencies within Indiana.

M. F. Bumgardner, program leader of the Earth Sciences Research Program at Purdue, considers it "particularly rewarding to have valuable inputs from a soil scientist who has had many years of field experience with the Soil Conservation Service. He has done a marvelous job in educating appropriate groups in state and local government to the potential applications of remote sensing in resource management."

To date, SCS has assigned more employees to work under the IPA than any other agency in the U.S. Department of Agriculture.

Gananda, New York, is a 10,000-acre new community with a projected population of 85,000 to 120,000 people. It will have a major impact on the Rochester area, presently the fastest growing urban area in New York State. SCS soil conservationist Richard Zimmerman was assigned under an IPA agreement to the Genesee-Finger Lakes Regional Planning Board to serve as a staff environmentalist for the Gananda project.

In this position, Zimmerman has worked on a variety of projects and plans, including noise pollution controls, soil erosion control during construction, and water quality. "It's tremendously rewarding work," he said, "and this is something that absolutely had to be done."

The Alaska Department of Natural Resources turned to the IPA to get an experienced plant materials specialist to help set up the Department's new plant materials center in the Matanuska Valley.

SCS plant materials specialist James B. Stroh—as manager of the Alaska Plant Materials Center—was assigned to establish the physical facilities for the center, develop the plant testing and production program, project that program over a 10-year period, and train the professional staff. In addition, Stroh does some plant collection, evaluation, and development work.

Every species of native Alas-

"We needed short-term, very technical help in relating soils to urban development," explained Frank Lamm of the Twin Cities Metropolitan Council.

The Montana Department of State Lands needed top professional help when it was directed by the state legislature to review reclamation plans submitted by mining companies

kan plant is eligible for inclusion in the program with the exception only of mosses, lichens, and algae. Selective species not native to Alaska are being included, with special emphasis on plants from Canada, Scandanavia, and the Soviet Union.

The center will support Alaskan seed and plant industries by providing to commercial producers foundation seed and planting stock of all released plant varieties. In addition to conservation plants, these will eventually include forest trees, grains, forage plants, vegetables, fruits and ornamentals.

The Tennessee Department of Public Health needed to develop regulations for subsurface sewage disposal and knew that soils data could be used to determine which areas would successfully accommodate such systems. To get technical help in interpreting soils data for the new regulations, the Department turned to the IPA. James Ault, director of the Department's Environmental Sanitation and Soil Waste Division, explained that "SCS is about the only place where we could get a trained soil scientist."

SCS soil scientist Charles Powers provided technical assistance first in writing the new regulations, approved by the Tennessee legislature last July, and then trained local health department personnel in the new regulations. Powers also served as a technical expert, advising the state on difficult problems.

The Bureaus of Community Environmental Control and of Land Protection, both in Pennsylvania's Department of Environmental Resources and both in need of technical help in soil science, teamed up to get the services of an SCS soil scientist through the IPA.

The soil scientist, Jay Weaver, trains sewage enforcement officers in a nine-county region around Pittsburgh on soil identification and interpretations. He also reviews plans for sanitary landfills, sewage and sludge disposal, coal refuse disposal and other environmental and community projects presented to the Department of Environmental Resources. "IPA is a desirable thing," Weaver said. "The Waste Division would like its own soil scientist but couldn't afford one. As for me, I've been mapping soils for 23 years, and the IPA makes it possible for me to apply the knowledge that I have. It's challenging, because I have to do more learning in areas such as soil mechanics."

As the examples above illustrate, it's clear that one of the best ways SCS can serve the public is through our newest management opportunity—the IPA. ♦

A Two-Way Street

The Soil Conservation Service not only assigns personnel to other agencies under the IPA, but receives valuable help from specialists assigned to SCS under the act. The University of Maine's Robert Rourke was assigned to the Upper Darby Technical Service Center in 1972 to determine what combinations of soil characteristics (primarily soil texture) could be used to estimate the liquid limit and plasticity index of a soil. His results can be used by Maine and by SCS throughout New England. The resulting engineering data provide vital information on whether a given soil can support buildings and roads.

Russell Pope, a senior water resource planner with the Wisconsin Department of Natural Resources (DNR), was assigned to SCS to work on the Wisconsin River Basin Study as of last December. His work typifies how the IPA can help SCS. He communicates to SCS the desires of Wisconsin state agencies concerning the river basin study (for example, DNR is interested in non-point sources of pollution) and can help SCS collect information by locating data already obtained by the state. For example, DNR had been doing mapping work on shoreland use and access; SCS learned of this work through the IPA, and the DNR mapping supplemented SCS evaluations of recreation potential. SCS carries out sediment studies at selected sites; through Pope's coordination, SCS will also take water samples at these sites, and DNR will analyze the samples in its laboratory for various parameters of interest to biologists from both agencies. Although Pope concentrates on the Wisconsin River Basin, other aspects of SCS work such as the P. L. 566 program, will also benefit, and DNR expects that the assignment will help both agencies in other parts of the state as well.

Shoreline Erosion Inventory In North Carolina

by Stanton Harrell

Soil conservation technician, SCS, Edenton, North Carolina

If you should visit a typical river or sound in northeastern North Carolina on a normal summer day, you would probably be struck by the tranquility of the scene. You might also come to the conclusion that these shorelines have remained largely unchanged since the days of the early English colonists. You could be wrong on both counts.

Although the waters are usually tranquil, they often become battering rams of destruction when angered by strong winds. And the destructive action of these waters has caused tremendous erosion along miles of unprotected shoreline.

Lloyd Overton, Sr., a retired farmer, has been watching this type of shoreline loss in Chowan County for more than 30 years. "I can remember when the annual Sunday School picnic was held in my yard, bordering Albemarle Sound, under two elm trees that stood 50 feet from the bank," he said.

The sound has marched inland, and the trees are gone with the tide.

Overton also remembers going to Drummonds Point with his father to buy fish. A boiler house used by fishermen to haul in their seines stood 500 feet out from the shoreline. Now all that remains are two old boilers that can be seen only at low tide.

Owners of waterfront property, well aware of the destruction wrought by wind and water, are fighting the effects of erosion that takes its toll in lost land every year. They have called on the Soil Conservation Service for assistance. To help, SCS began by starting an inventory on the amount of shoreline lost to erosion over the past 30 years in 11 eastern North Carolina counties. The effort will be expanded to cover all coastal counties in North Carolina.

The results are sometimes startling, ranging from negligible losses up to several hundred feet—a severe loss of shoreline. The Leigh farm on Albemarle Sound, located at the mouth of Little River in Perquimans County, has lost more than 250 linear feet along a 5,500 foot expanse of sound shoreline over a 31-year period. This amounts to more than 36 acres of good farmland and resulted in the deposit of 278,437 tons of sediment to pollute the vital estuaries of Albemarle Sound.

A man who qualifies as an expert on shore erosion—



Over a 31-year period, 36 acres of prime farmland on the Leigh farm in Perquimans County, North Carolina, have been lost to Albemarle Sound.

through personal observation and interest—is Hoyle Jones, a farmer in the Durants Neck section of Perquimans County.

"There have been periods of anxiety living here," he recalls. "During Hurricane Hazel in 1954 the bank was melting away like butter. I lost 50 feet in one day's time."

In 1955, for protection of his dwelling, Hoyle Jones moved his house some 200 feet back from its previous location. Today, with erosion continuing, the house is less than 150 feet from the waterfront.

To obtain scientific data on shoreline loss, the Soil Conservation Service is using aerial photos made 30 years ago and comparing them with up-to-date ones. In addition, SCS people are conducting inspections on the sites to determine the heights of banks and other factors. Data on exposure, soil type, land use, and other factors will be used to determine the exact cause of shore erosion and factors affecting the rate of erosion.

The total dollar loss from shore erosion is difficult to assess. There is the loss of valuable land, plus the value of timber, crops, and sometimes even a dwelling or other building. But how do you assess the damage done when quantities of mud settle on the bottom of a productive estuary, polluting this natural environment? How much does it cost to remove this sediment and overcome the damage done by pollution?

These questions are awaiting an answer.

It is known, from surveys already completed in 11 counties, that a total of 6,143 acres were lost during the 30 year period of the study. This resulted in 30 million tons of sediment pollution.

Farmers and other landowners in northeastern North Carolina are concerned about pollution of estuarine waters, and wondering about the effects on sedimentation pollution on fish and other marine life, on aquatic vegetation, on wildlife in general, and the effects this natural destruction will have on the total ecosystem in years to come.

Since they are concerned about quality of the environment, they are working to preserve it. The Soil Conservation Service is working closely with them toward the mutual objective. ♦



Although expensive, groins and bulkheads such as these in Chowan County, North Carolina, are effective in helping control shore erosion.



Molybdenum-toxic areas are often at mountain footslopes. Here, soil samples are being taken and will be described for each site.

The Poisoned Cattle of Willow Creek

by Joe Kubota

Research soil scientist, SCS,
U.S. Plant, Soil, and Nutrition Laboratory, Ithaca, New York

Peter Jackson had a problem.

Jackson is a Montanan with a ranching operation that spreads from Willow Creek to irrigated uplands where he grows most of his alfalfa. His problem was that his cattle did poorly when grazed on the wet bottom lands of Willow Creek.

A veterinarian, called in by Jackson, suspected that the cattle suffered from copper deficiency. The vet tried to correct the deficiency with injections of copper glycinate and, sure enough, the animals improved.

Most ranchers would have given their cattle copper supplements and left it at that, but Pete Jackson is hardly a typical rancher. He had been a director of the Montana Association of Conservation Districts and had served on the Grass Conservation Bureau of the Montana Board of Natural Resources and Conservation. He produces most of his animal feed and

closely watches both animal performance and forage crop production to obtain maximum returns from his ranching operation.

Jackson's observations of poor animal growth when grazed in certain areas are not unusual. Not all forage crops grown are equally nutritious to animals and studies are made to identify where and why such areas occur. The Soil Survey Investigations Division of the Soil Conservation Service cooperates with the U.S. Plant, Soil, and Nutrition Laboratory, Agricultural Research Service, and Cornell University in these studies.

Willow Creek has many characteristics of areas that produce forages with excessive amounts of the trace element molybdenum (Mo) in the presence of normal amounts of copper. Jackson's cattle were actually suffering from molybdenum poisoning, for which supplemental copper is a simple therapy. Too much molybdenum induces copper deficiency in the cattle. Molybdenosis and molybdenum poisoning are common terms for this problem.

A polyvalent metallic element, molybdenum resembles chromium or tungsten in many of its properties. As a hard silver-white metal, it is useful to man in strengthening and hardening steel.

As a trace element in plants and animals, however, the beneficial role of molybdenum depends on how much is present. Plants need Mo in the enzymatic reduction of nitrate. Most common plants will grow and mature if they have, on an oven dry weight basis, about one part per million (ppm) of Mo—roughly a few hundredths of an ounce per ton of dried plant material.

With animals, molybdenum plays a more vital role, being tied to the biochemical utilization of copper. Exactly how molybdenum and copper affect each other is not known, but it is certain that an imbalance in these two elements means trouble. Whereas too much molybdenum induces copper deficiency, too little molybdenum induces copper toxicity, if copper levels are high. Molybdenum poisoning is a more common problem in the United States than is molybdenum deficiency.

Cattle suffering from molybdenosis grow poorly and have faded hair coats, foul-smelling feces, and profuse diarrhea.

Excessive Mo does not show up in reduced plant growth, however, because plants are tolerant to greater concentrations of the element than animals.

The first intensive study to determine the distribution of molybdenum-toxic areas and soil characteristics was made in Nevada in the early 1960's. E. A. Naphan, the SCS state soil scientist, provided the stimulus to get this study underway.

From the study, it was discovered that one can identify soils that produce molybdenum-toxic forage plants. Exceedingly large amounts of molybdenum were found in alluvial soils formed in granitic alluvial fans. But not all soils with high molybdenum caused toxic levels in forages. Only plants that grew on wet parts had 20 ppm or more of molybdenum, a level that causes molybdenosis.

Subsequently, plants grown in the greenhouse showed that they take up more molybdenum when grown in wet than in dry soils.

Studies in Baker Valley, Oregon, confirmed the Nevada findings and also showed why molybdenosis is not a problem on flood plains of large rivers. The soil Mo content of the Powder River flood plain was uniformly low, but it was quite variable on flood plains of tributary streams. Only when

Effect on Man?

Scientists know a good deal more about how molybdenum affects plants and grazing animals than they do about the element's effects on man.

Studies of milk in several states indicate that molybdenum levels in unprocessed milk increase in a molybdenum-toxic area, sometimes to 100 micrograms of Mo per liter of milk. But while this tends to explain why Mo toxicity is often strongly reflected in calves, we drink milk which has been mixed at the dairy from many farms.

Certainly, the plant and animal components in our food chain provide a safety factor for people, since deficiencies or excesses of molybdenum would show up in plants and animals before they could affect us.

On the positive side, dental researchers have discovered that children born and raised in areas of high molybdenum have fewer decayed, missing, or filled teeth than children of comparable ages outside of these areas. Studies in New Zealand, England, and Hungary report that molybdenum in the presence of comparable levels of fluoride helps reduce dental decay rates.



LEGEND

GENERAL LOCATION OF RELATIVELY BROAD AREAS OF HIGH (>10 TO 100 PPM) MOLYBDENUM FORAGE PLANTS ASSOCIATED WITH INCIDENCE OF MOLYBDENOSIS.

LOCALIZED AREAS, PRINCIPALLY ISOLATED ALLUVIAL FANS, SWALES AND DEPRESSIONS, OF HIGH MOLYBDENUM PLANTS.

AREAS WHERE GENERAL BACKGROUND LEVELS OF MOLYBDENUM ARE MODERATELY HIGH IN SOILS AND PLANTS.

PRINCIPAL MOUNTAIN RANGES.

PRINCIPAL RIVERS.

a tributary stream deposited a large amount of molybdenum were levels high enough.

Because of similarities in landscape, geology, and soils, the Oregon and Nevada studies suggested that problem areas might also occur in Washington, Idaho, Montana, Wyoming, and Colorado, even though molybdenosis was not a generally recognized problem of livestock production in those states.

State SCS offices in the five states were contacted; the SCS offices in turn contacted agricultural experiment stations to obtain what was known about Mo toxicity. In truth, not much was known about it.

Next, soil survey maps and geologic maps were evaluated with the soil survey staff to select likely areas for investigation.

It was at this stage of the study that molybdenum poisoning was located on the Jackson ranch in Montana. Plant samples were shipped to the U.S. Plant, Soil, and Nutrition Laboratory in Ithaca, New York. They showed that the amount of Mo in legumes was well within the toxic range for grazing animals, while grasses had appreciably less of the element.

Samples were collected the first year from only two sites on the Willow Creek flood plain—the Jackson Ranch and a neighbor's ranch downstream. The findings were sufficient to provide the basis for intensive sampling the following year. In this manner, the geographic extent of high molybdenum soils was delineated to cover the 10-mile extent of Willow Creek.

As in Oregon and Nevada, a significant feature was that forage plants grown on well-drained soils did not have toxic amounts of Mo. Most of the forage on these soils is harvested as hay and is not grazed. Molybdenum in hay is less toxic than is molybdenum in fresh forage but the reason for this difference is not known.

The distribution of the molybdenum-toxic areas now recognized in the West is shown in Figure 1. The Florida Everglades is the only area east of the Rockies where excess molybdenum is known to be a problem. In the West, the distribution pattern is consistent with the combined role of physiography, bedrock, and soils that give rise to Mo-toxic areas. "Yellow calf disease" in Hawaii is also due to excess Mo, but the rock-soil-plant pattern there is different, with volcanic ash as the dominant soil-parent material and soils at higher elevations moist most of the time—and consequently behaving as wet soils in western bottom lands.

The molybdenum study illustrates how soil survey information can be applied to solve some aspects of problems in animal nutrition. The information about bedrock, surficial geology, vegetation and management practices, routinely noted by soil scientists, represents collectively an enormous body of information.



At right, a healthy calf; at left, one suffering from molybdenosis.

The study of soil-related problems in animal nutrition is one of the types of research being pursued at the U.S. Plant, Soil, and Nutrition Laboratory. The multidisciplinary staff at the laboratory includes biochemists, chemists, plant physiologists, and animal nutritionists, as well as soil scientists. Each studies trace-element behavior from a different point of view, seeking to establish biochemical roles of trace elements, the mineral requirements and factors that affect their availability to plants and animals.

The work of the laboratory becomes increasingly important as changes in land use result in changes in trace-element cycling and environmental quality. Information gained through research such as the molybdenum study provides a means to establish natural background levels of trace elements, and factors that affect them. As man changes the world around him, science needs to know the ranges of trace-element concentration that exist in natural soils. ♦



In the Spring of 1935 . . .

The nation's second great duststorm in less than a year swept eastward across the Nation on March 6, 1935. Clouds of topsoil from fields of Kansas, Colorado, Texas, and Oklahoma darkened the skies of eastern seaboard cities and those of the Atlantic Ocean.

That same month the Soil Erosion Service, with its 39 erosion control projects and its assigned 51 Emergency Conservation Work erosion camps, was transferred to the U.S. Department of Agriculture from the Interior Department by the Federal Emergency Administrator for Public Works. The transfer was approved by President Franklin D. Roosevelt on March 25, 1935.

On March 27, 1935, the Secretary of Agriculture directed the unification of the Department's activities pertaining to soil erosion under the Soil Erosion Service, making the transfer effective April 1. Without a single dissenting vote, both houses of the 74th Congress passed what became Public Law 46 —the establishing and enabling act of the Soil Conservation Service. It was signed by the President on April 27, 1935. The same day, the Secretary of Agriculture issued Departmental Memorandum 673 establishing the Soil Conservation Service in the Department of Agriculture. It provided that the new agency include the activities conducted under the SES and designated Hugh H. Bennett as the agency's chief.

Recon...

Silt in a blizzard. An estimated 50,000 tons of silt from as far away as Nebraska and the Dakotas were deposited on one Minnesota county during the dust storm accompanying the "blizzard of the century" in January. The Douglas County Soil and Water Conservation District estimated the tons of silt by marking off an area in the snow, melting it, weighing it, and computing the amount deposited in the county during the January 10-11 storm.

Pipeline to pipeline. The Soil Conservation Service is providing information for the environmental impact statement for the Arctic Natural Gas Pipeline Project. SCS offices along the route are contributing technical data for the statement, primarily on soils and vegetation. E. F. Sedgley, state resource conservationist for SCS in Colorado, is on loan to the U.S. Department of the Interior to assist with the statement. Recently, 15 North Dakota SCSers put together data, requested by Sedgley, on principal soil series and major range sites, with descriptions, known historical-archaeological-unique scenic sites, and corrections in indicated land use along the proposed pipeline route through North Dakota. Sedgley notes the 48-inch high pressure pipeline will extend from the North Slope of Alaska through Canada to Monchy, Saskatchewan, where it splits and continues to Delmont, Pennsylvania, in the East and to Los Angeles in the West.

Protection to livestock. Windbreaks and shelterbelts in South Dakota provided protection that kept livestock losses to a very minimum during a blizzard described as the worst since 1884, reports SCS State Conservationist V. W. Shally. The January blizzard swept across parts of the state, with more than 27 inches of snow falling at Huron during the month. Livestock losses are estimated at more than $2 million.

Some 44,000 landowners and operators in North Dakota recently received a copy of a new 4-page pamphlet telling of the protection afforded by windbreaks and shelterbelts.

The Soil Conservation Service in North Dakota developed the forestry pamphlet, "Tree Plantings Have Many Environmental Benefits," and took care of the mailing costs. The cost of the publication was shared by the Lincoln-Oakes Nurseries and the North Dakota soil conservation districts.

Soil surveys

Idaho

Minidoka Area. By Harold L. Hansen. 1975. Soil Conservation Service in cooperation with University of Idaho College of Agriculture and the Idaho Agricultural Experiment Station. 72 pp., illus.; maps.

Kentucky

Menifee and Rowan Counties and Northwestern Morgan County. By Peter E. Avers, Jarrell S. Austin, John K. Long, Paul M. Love, and Carl W. Hail. 1974. Forest Service and Soil Conservation Service in cooperation with Kentucky Agricultural Experiment Station. 88 pp., illus.; maps.

Minnesota

Douglas County. By Donald E. DeMartelaere. 1975. Soil Conservation Service in cooperation with Minnesota Agricultural Experiment Station. 112 pp., illus.; maps.

Texas

Swisher County. By Wayburn D. Mitchell, Louis L. Jacquot, and Billy R. Chance. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 45 pp., illus.; maps.

Ward County. By William H. Dittemore, Jr., and Ervin L. Blum. 1975. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 50 pp., illus.; maps.

West Virginia

Brooke, Hancock, and Ohio Counties. By Walter J. Ellyson, Merrill Kunkle, Joseph D. Ruffner, and John Webb. 1974. Soil Conservation Service in cooperation with West Virginia University Agricultural Experiment Station. 62 pp., illus.; maps.

New Publications

Seeds of Woody Plants in the United States. *1974. C. S. Schopmeyer, Technical Coordinator, USDA-Forest Service. Agr. Hbk. 450. 883 pp., illus. $13.60.*

This 883-page volume is a completely rewritten and greatly expanded successor to the *Woody Plant Seed Manual,* published in 1948. The first section of the reference book covers general principles and methods of seed production, processing, and germination. The second section provides specific handling methods and data for more than 800 species in 188 genera of commercial and ornamental trees and shrubs.

More than 100 Forest Service scientists and an equal number of cooperators in government, industry, and universities were involved in a 5-year effort to produce this reference volume.

Meetings

April

26	*Nature Conservancy, Washington, D.C.*
27–29	*Sixty-third Annual Meeting Chamber of Commerce of the United States, Washington, D.C.*
27–May 1	*National Association for Community Development, Portland, Ore.*
28–May 1	*Garden Club of America, Washington, D.C.*

May

3–4	*Sierra Club, San Francisco, Calif.*
4–7	*National Forest Products Association, Washington, D.C.*
11–14	*National Forest Products Association, Washington, D.C.*
15–16	*Southern Forest Institute, Inc., Panama City, Fla.*
18–22	*American Institute of Architects, Atlanta, Ga.*
18–23	*National Council of State Garden Clubs, Inc., Salt Lake City, Utah.*
20–23	*International Association on Great Lakes Research, Albany, N.Y.*
29–30	*Southern Forest Institute, Inc., Biloxi, Miss.*

June

1–4	*Twenty-second National Watershed Congress, Portland, Ore.*
8–12	*General Federation of Women's Clubs, Washington, D.C.*
8–13	*American Water Works Association, Minneapolis, Minn.*
15–19	*Air Pollution Control Association, Boston, Mass.*
16–20	*American Geophysical Union, Washington, D.C.*
18–20	*Twelfth National Agricultural Plastics Conference, Atlantic City, N.J.*
22–25	*Sixty-eighth Annual Meeting of American Society of Agricultural Engineers, Davis, Calif.*
22–25	*National Association of Counties, Honolulu, Hawaii*
23–25	*American Plywood Association, Vancouver, Canada*
24–28	*Association of Consulting Foresters, Greenville, Me.*
26–27	*Southern Forest Institute, Inc., Asheville, N.C.*
29–July 3	*American Seed Trade Association Convention, Houston, Tex.*
30–July 3	*National Environmental Health Association, Minneapolis, Minn.*

July

3–8	*National Education Association, Los Angeles, Calif.*
13–17	*Seventy-fifth Annual Meeting of American Society of Landscape Architects, San Antonio, Tex.*
19–23	*American Association of Nurserymen, Inc., Chicago, Ill.*
20–24	*National Federation of Business and Professional Women's Clubs, Inc. of the USA, Las Vegas, Nev.*

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
AGR 101



POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

MOVING? Send present mailing label and new address, including zip code, to Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20401.

1.6
So3S
Cop 5



SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / May 1975

Worth Preserving...and Talking About

Not many days ago, a young man, whose personal memory of the world's events doesn't go back further than the Korean conflict, startled a group of us SCSers with a question.

It was simple enough; it was sincere: Did we have anything tangible to show for our years of work in soil conservation?

One veteran conservationist nearly exploded, and the rest of us weren't at a loss for words. We told him in no uncertain terms what this country looked like 40 years ago when the Soil Conservation Service began. We pointed out that much of our rangeland was desolate; that much soil of the South had been written off as a total loss; that much of our wheat and grazing land today was lumped into a vast area called the Dust Bowl, where the principal agricultural activity of the 1930's was the foreclosure sale.

We contrasted this dismal picture of the past with the much improved picture of the present, and explained that despite some critical problems today, that there is really no comparison between the look of the land of 1935 and 1975.

The young man, astonished by the fervor of our response to his question, said only, "I didn't know that."

As we approach the 200th anniversary of our Declaration of Independence, SCS employees and district personnel might take heed of the young man's innocent question and set about documenting some local history.

Gather up old photographs while you can. Tape interviews with the SCSers and farmers and ranchers who were operating in 1935. And conservation districts, whose formation was termed "one of the most important movements in the history of agriculture" by the late Hugh Hammond Bennett, first chief of SCS, should consider appointing an historian, if they have not already done so. Youth boards, or local high school or college history students, might also want to make the local history of soil and water conservation a class project during 1976. And perhaps libraries can be talked into keeping a permanent historical file or shelf or scrapbook of local conservation history.

For our part, the Soil Conservation Service is putting together a Bicentennial slide presentation on the development of the conservation idea in America during the last 200 years. It will be available to SCS and district offices in 1976 in helping to tell our story, particularly to those growing legions of people who don't recall the thirties.

Let's all take advantage of the forthcoming American Revolution Bicentennial celebration to help answer that young man's question for as many Americans as possible.

Kenneth E. Grant

SOIL conservation

Contents

2 From the Administrator

4 Ferrying to Work
Gordon S. Smith

6 Spuds in Alaska
James E. Preston

7 'Dove' Proso Millet—'Strictly for the Birds'
John D. Powell, E. R. Beaty, H. J. Haynsworth, and W. C. Young

8 A Look at One of the First GPCP Contracts
Dale D. Allen

10 'Neighborly' Windbreak
Martin C. Lund

11 Brushing Up on Wildlife

12 Round Hill: An Exhibit Farm That Works
Joseph B. C. White

16 'Conservation Farming Is the Best Therapy We Have Found'
John Badger and Dick Barber

18 RC&Ds
Dick Lehnert

22 Recon . . .

22 Soil Surveys

23 Meetings

COVER: Visitors to the exhibit farm at Round Hill in Allegheny County, Pennsylvania, share the excitement and energy of the farm's flock of Suffolk sheep being let out to pasture in mid-April. (See story on page 12.)

May 1975, Vol. 40, No. 10

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in transaction of public business required by law of this Department. Use of funds for printing **Soil Conservation** has been approved by the Director of the Office of Management and Budget through July 31, 1978.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission
Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names
Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions
$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402



Block Island, off the coast of Rhode Island, is the site for one of the more unique journeys by SCS in providing conservation technical assistance.

Ferrying to Work

by Gordon S. Smith

Information specialist, Northeast Technical Service Center, SCS, Upper Darby, Pennsylvania

It's been more than 300 years since a Dutchman named Adrian Block sailed around a 6,900-acre, porkchop-shaped island and named it after himself.

Today, that island—10 miles off Point Judith in Rhode Island—is the site for a 2-day annual visit by the Soil Conservation Service to provide conservation technical assistance to the islanders. The trip is one of the more unusual ones by SCS—beginning by ferry from Point Judith.

Last year, Robert E. Lee, SCS soil conservationist for southern Rhode Island, was accompanied to the island by John Hannah, county agent for the Extension Service. The two offered a unique natural resource service to the islanders.

"Using this two-man team approach, we felt we could assist Block Islanders with most any resource problem they have," Lee said.

"As the SCS representative, I handle land, water, wildlife, conservation engineering, and vegetative problems.

"John Hannah tackles such things as plant diseases, growing fruit and vegetables, landscaping yards, and group education activities. He is, in effect, an extended arm of the University of Rhode Island with access to numerous excellent research facilities."

Block Island, settled in 1661 by a small group of Englishmen who came over from what is now Rhode Island to make peace with the native Indians, has experienced great changes in land use over the years.

Commercial fishing and farming were once the mainstays but today only two fishing operations and one dairy farm remain. The fishing resource was depleted, and much of the limited farmland was divided and subdivided with each passing generation until farms were too small to cultivate on a profitable basis. Spiraling shipping costs to the mainland helped put an end to serious farming. About all that remains in agriculture are the numerous small vegetable and flower gardens that dot the rolling landscape. Much of the former farmland is now being developed for vacation homes.

Gearing up for their visit to Block Island, Lee and Hannah first sent a news release to the *Block Island Times* announcing the dates they would be on hand and their hotel phone number for previsit messages.

Hannah gathered Extension Service publications that might be helpful to the islanders. Lee assembled the conservation plans for 13 district cooperators on the island and a list of islanders who had called or written him in recent months. In spite of the nonfarming situation now on the island, residents show considerable interest in good protection of their natural resources, Lee reports.

Loading up their gear and information materials, the two caught the early ferry and were on Block Island before lunchtime.

The first order of business was answering the phone messages received at the hotel prior to arrival. Some of these problems were answered with a phone call. Others required an onsite visit with a landowner. By early afternoon the men were headed out to visit landowners.

The initial stop was at the town hall to see First Warden Herbert Whitman, the island's top elected official.

There, Lee and Hannah were updated on island resource problems: what to do about elm trees being killed by the blight; a need for better information on the best trees, shrubs, and grasses to plant in the salty environment; how to establish protective cover along the shifting and eroding shoreline.

One of the major problems on the island is a familiar one also on the mainland: inadequate sewage disposal. Tourism has become the big industry on the island and has overtaxed hotel and restaurant septic systems to such a degree that it threatens to close businesses in New Shoreham, the island's only town. Plans are underway for a new sewage system, and SCS has provided soils information.

Continuing on their way, Lee and Hannah found John Littlefield on a highway repair job. Littlefield, the island's highway superintendent, is also a part-time farmer and a district



John T. Hannah and Robert E. Lee check kudzu plants which have stabilized the steep banks on the property of Islander John Gray.

cooperator. The chance meeting provided an opportunity for Littlefield to gain information about plants to reduce roadbank maintenance costs and wildlife plants to attract game on his farm.

The Reverend W. Stanley Pratt, pastor of the First Baptist Church, and his wife Winifred were next on the team's list. They operate the Red Shutters shop on the island and sell honey, homemade candles, and unique souvenirs. Their prime resource problem was controlling plant pests and diseases without creating a hazard for their extensive beehives.

At another stop, Lee talked with John Gray, whom he has worked with for several years to slow the natural process that chews at the 150-foot picturesque cliffs near Gray's home. Gray, a real estate agent on the island, moved his house back from the cliffs several years ago but is still anxious about the continuing erosion problem. Lee had recommended Japanese black pine, autumn olive, kudzu, and other plants to help hold the soil in place. He noted on this trip that the plantings had slowed the process, especially in the deep gullies that were eating back inland.

A bit later, the two visited Mrs. Margaret C. Self, editor of the *Block Island Times*, and discussed news related to conservation.

By late afternoon on the second day, Lee and Hannah had contacted most of the Block Islanders on their lists. With a number of gratifying comments about the help they had furnished and thanks for the time they spent on the island, they boarded the ferry for Point Judith and headed for home, satisfied that their somewhat unusual, challenging, and interesting assignment had been a success. ♦



Gene Jenn harvests potatoes on his farm in Alaska with Kachemak Bay and glaciers in the background.

Spuds in Alaska

by James E. Preston

District conservationist, SCS, Homer, Alaska

Alaska potatoes?

They're "in" on the Kenai Peninsula, along with fish, minerals, oil, and recreation.

Former construction worker Gene Jenn harvested 20 tons per acre last year, aided by an unusually warm season and a heavy application of fertilizer.

Jenn, a director for the Alaska Association of Soil Conservation Subdistricts and past supervisor for the Homer Soil Conservation Subdistrict, came to the Homer area 8 years ago to do construction work.

Although he didn't realize it at the time, he had bought 5 acres of some of the best agricultural land in the area —Beluga silt loam. Only about 7,000 acres of this soil are available for agricultural uses in the Homer area, about one quarter of it having been subdivided.

Shortly after Jenn arrived, he left construction work, built a greenhouse, and began farming. This year, he's shipped about 10 tons of potatoes to Kodiak Island and is selling the rest to a distributor on the Kenai Peninsula.

It takes about 3 years to get Beluga silt loam into top agricultural production. The natural heavy cover of bluejoint, firewood, and alder is difficult to incorporate into the soil. ♦

'Dove' Proso Millet-- 'Strictly for the Birds'

by John D. Powell, E. R. Beaty, H. J. Haynsworth, and W. C. Young

Superintendent, Americus Plant Materials Center, SCS-University of Georgia, Americus, Georgia; professor of agronomy, University of Georgia, Athens, Georgia; plant materials specialist, SCS, Athens, Georgia; and former plant materials specialist, SCS, Fort Worth, Texas, now retired

A new crop—'Dove' proso millet—is "strictly for the birds" and is so popular that demand for seed exceeds supply.

Released last year as a wildlife food planting by the Soil Conservation Service and the University of Georgia Agricultural Experiment Stations, 'Dove' proso millet, *Panicum miliaceum* L., is the first proso millet to grow well in the southern United States.

A need had existed for a proso millet that could produce a heavy seed crop in the southern states to attract game birds, particularly doves. From a number of domestic strains and more than 30 plant introductions, 'Dove' proso millet—an accession from India—was selected as the best during studies that began in 1961.

Collected by the Agricultural Research Service as plant introduction No. 196292, *Panicum miliaceum* L. showed more growth, more rapid development, and higher grain yield than the other plants studied by SCS and the University of Georgia Agricultural Experiment Stations.

It matures in 70 to 80 days and thus can be timed to mature at selected periods in the summer and fall, such as hunting season. At trial plantings in soil and water conservation districts in the Southeast, it has proved highly successful in attracting doves, hence its name.

Seed was increased at SCS's Americus Plant Materials Center and distributed first for testing and later for commercial seed production in soil and water conservation districts, primarily in Georgia, the Carolinas, and Alabama.

In general, 'Dove' proso millet is easily grown, dependable, high yielding, free from disease and pests, and easily harvested by direct combining. Best results have been attained on well-drained soils that have been well prepared and properly fertilized. At maturity, the plant can reach 4 to 6 feet on fertile sites.

A summer annual, 'Dove' proso millet puts forth new shoots at the crown like cereal grains. Vegetation is stemmy rather than leafy, and the leaves are narrow, drooping, and pale yellow-green on comparatively heavy stems.

The seed, produced in a loose, drooping seedhead, are smooth and the color of light straw. They number 48,000 per pound. ♦

W. J. Reed(left) inspects 'Dove' proso millet on his farm in Castleberry, Alabama.





Jack Schuster, who signed one of the Nation's first Great Plains Conservation Program contracts, discusses an irrigated cover crop with Charles D. Ball, SCS conservation technician, now retired. The rye, growing on cotton land, furnishes winter and spring grasses.

Eighteen years later...

A Look at One of the First GPCP Contracts

by Dale D. Allen
Information officer, SCS, Temple, Texas

One of the Nation's first Great Plains Conservation Program (GPCP) contracts was signed at Muleshoe, Texas, on December 20, 1957, by H. E. Schuster and his son Jack.

Today, nearly 18 years later, the way the farm is tied down is silent proof of the effectiveness of the program.

Last year, right after the worst windstorm in 6 years had raked the area in West Texas, Jack Schuster noted that his land had blown very little.

"We caught a lot of sand from some adjoining farms, but our land took the wind with little trouble," he said.

"Before we went into our GPCP contract, at least half our land would have blown during a storm like we had last week. In fact, similar storms in the early 1950's blocked the driveway to our house several times; even the county road was blocked a few times."

That week, however, fat cattle were grazing an irrigated winter cover crop planted on cotton land late the summer before for soil protection.

A dryland cotton field was also protected by a rye cover crop. A severe drought gripped the area, so the rye was in critical condition; yet it was holding the sandy soil in place.

Jack has operated the farm in partnership with his mother since his father died. His father was a director of the Blackwater Valley Soil and Water Conservation District when the GPCP contract was signed.

A native of West Texas,

Schuster remembers the Dust Bowl days.

"I recall watching those fronts move in from the north and northwest during the 1930's," he said. "It might be perfectly clear here at home, but you could see those giant clouds of dust rolling in. They must have been several miles high. The front would come in, then the dust would blot out the sun making the day dark as night. We lit the lamps many times during midday."

Starting in 1957, with GPCP help, the Schusters applied a complete conservation program in 4 years to their 1,313-acre farm. Major practices included grass planting, grassland improvement measures, a conservation cropping system, stripcropping, and major overhaul of their water-wasting irrigation system.

"We had been wanting to change our open main irrigation ditches to underground pipe for several years to save water as well as labor," Schuster said. "But frankly, we couldn't afford it."

"We had always row-irrigated out of open ditches. On this sandy land, the main ditches wasted lots of water. We would drown part of our crops while other areas were not getting enough water. After installing underground pipe, we began irrigating with sprinklers. As we learned later, sprinklers are the only efficient way to irrigate this land without wasting massive amounts of water."

The Schusters were irrigating fewer than 300 acres when they entered into the GPCP contract. After installing the underground pipe and sprinklers, they immediately began to irrigate more land but with less water.

"Under GPCP, we learned to take a little water and to do a lot with it. Where we had been irrigating slightly less than 300 acres poorly, we immediately were able to irrigate 500 acres efficiently. Yields jumped, but overall water use dropped. This program started the most amazing irrigation education program out here that you ever saw."

He said farmers who never heard of GPCP are benefiting from this technical advance because the system taught by GPCP is now common throughout the sandyland section of the Plains.

Before 1957, Schuster said it took four men to irrigate 300 acres; after installing the GPCP pipeline and accompanying non-GPCP cost-shared sprinklers, the same four men were able to irrigate 500 acres on the farm.

Schuster also learned to grow irrigated grazing crops for livestock after switching to sprinkler irrigation. He now buys stocker cattle to graze during the winter months on his cover crops, then sells them when it's time to plant cotton or grain sorghum.

GPCP also taught area farmers how to properly manage crop residues, how to establish several new range and pasture grasses, and how to manage grassland.

It is also largely responsible for development of parallel terracing techniques, a system whereby terraces are built an even number of rows apart. Terraces are parallel from end-to-end and can be spaced to accommodate 4, 6, or 8-row equipment. Although more expensive than other terrace systems, parallel terraces have now become the standard terrace in the Southwest.

Schuster said the program had benefited the entire Nation, not just the Plains region. He pointed to increased agricultural productivity, technological advances promoted by GPCP, and conservation of land and water resources.

"The problem with GPCP is that it will be needed more in the next 15 years than in the last 15," Schuster said. "Here where I live, we will be running out of irrigation water in about 15 years. If people don't learn how to dryland farm these sandy soils so they won't blow, watch out. Farmers don't like people telling them what to do, but with a well-run cost-share program, you can sell a lot of new ideas in a hurry." ♦

Who's First?

There's still a bit of mystery over who signed the first Great Plains Conservation Program contract.

Eleven contracts were signed in the first month of the program—December 1957—on 15,424 acres in Texas, New Mexico, Kansas, and North Dakota.

The first three GPCP contracts were signed on Thursday, December 19, 1957, by Berthold Sackman in Streeter, North Dakota—a 3-year contract on 1,280 acres; Walter L. Woods in Seminole, Texas—a 3-year contract on 160 acres; and Robert H. Hunt, also of Seminole—a 3-year contract on 160 acres. On Friday, a fourth contract was signed by H. E. Schuster and his son in Muleshoe, Texas.

'Neighborly' Windbreak

by Martin C. Lund

District conservationist, SCS, Grand Forks, North Dakota

An 800-foot windbreak is making life more interesting and comfortable for property owners in a cluster of country homes south of Grand Forks, North Dakota.

Skirting eight 100-foot lots, the dense four-row windbreak tames the wind, adds beauty and privacy to the area, and provides a haven for a variety of small birds and animals.

The windbreak began 17 years ago and set a pattern of neighborly cooperation, according to Henry Ellertson, who bought the first lot.

"I wanted to get out of the city and return to rural living," said Ellertson.

"At that time there was no protection from the northwest or west winds—only open fields. Several other individuals who bought adjacent lots felt we should get together and plant a windbreak.

Mrs. Lloyd Canute spearheaded negotiations and talked with Soil Conservation Service personnel. The planting plan was worked out at a meeting of the eight lot owners.

The site was summer fallowed in 1958 and the trees were planted by the Eastern Grand Forks County Soil Conservation District in 1959. The farmer who had sold the land for the lots did the cultivating, and each lot owner agreed to keep the weeds out of the rows.

Plant species were chosen for beauty and other values in addition to their "wind breaking" capacity—green ash, caragana, honeysuckle, and cotoneaster. Plants in the inside rows are slow growing to prevent interference with the powerline that goes across the back of the lots.

Now, after 16 years of growth, the windbreak gives adequate protection from winter storms and softens summer breezes. But there are other rewards.

"It has added $2,000 in value to my country home," claimed Ellertson, "and you should see the number of birds that use the trees for shelter and nesting."

Another homeowner who takes pleasure in having the windbreak is Mrs. Edna Raketti.

"I have installed some birdbaths and a bird feeding station," she said. "My brother lives in a rural development without tree protection. When he visits me he always comments on the number of birds singing in the trees during the early morning hours." ◆

Eight neighbors went together and shared in the cost and maintenance of this windbreak near Grand Forks, North Dakota. At left, the author discusses its care and maintenance with Mrs. Edna Raketti just a few years after it was planted. At right, the windbreak as it looked 10 years after planting.







Brushing Up on Wildlife

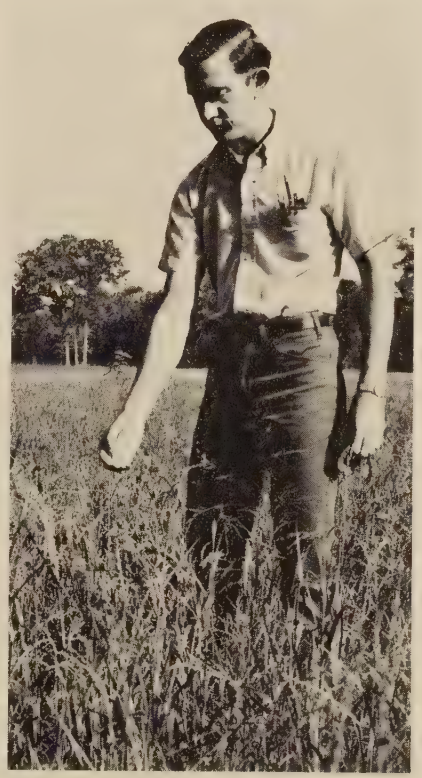
Managing brush to maintain or benefit wildlife while increasing forage for livestock is big business in Texas. SCS biologists and range conservationists in Texas developed the brush pattern technique in the mid-1960's and it's now being used on nearly 7.7 million acres in Texas. Brush pattern techniques vary, but consist of alternating strips of brush and forage in carefully designed patterns to provide food and cover for wildlife. Alternating strips are cleared or thinned so choice livestock forage plants can thrive without undue competition from the brush for sunlight and moisture.

Among the estimated 26,000 land users in Texas managing brush for both wildlife and livestock is H. H. Moore of Navasota, Texas. Moore has controlled oak brush in a 500-acre pasture in strips, as shown in the photograph above. The cleared areas are 500 to 600 feet wide and planted to Selection 75 kleingrass. Moore now has strips of lush pasture alternating with 300-foot wide strips of dense brush. "As a result, I'm growing some top quality forage, but at the same time I am maintaining a large population of deer and other wildlife," Moore said.

Moore's pasture had previously been so densely infested with brush—including post oak, yaupon, winged elm, greenbriar, and Spanish mulberry—that it produced little livestock forage. It did, however, provide cover for a large deer herd, and Moore wanted to leave enough brush for the herd while improving livestock forage.

The Soil Conservation Service at Bryan provided technical assistance through the Brazos-Robertson Soil and Water Conservation District and helped Moore mark out the strips.—Curtis C. Cox, soil conservationist, SCS, Bryan, Texas. ♦

Above, strips of brush alternate with areas cleared and planted to improved grasses on a 500-acre pasture of H. H. Moore in Navasota, Texas. Below, SCSer David H. Beyer looks at a planting of Selection 75 kleingrass in Moore's pasture.



Round Hill: An Exhibit Farm At Work

by Joseph B. C. White
Superintendent, Bureau of Conservation, Allegheny County. Department of Parks, Recreation, and Conservation, Pittsburgh, Pennsylvania

Round Hill Farm in Allegheny County, Pennsylvania, is a part of a park. In reality it is a vestige of a county and region that was largely agricultural a century ago. Now flooded with industry, urban sprawl from metropolitan Pittsburgh, and a complete turnover in the economic pattern, Allegheny County has fewer than 400 farms. In a few more years there will be none.

The role of Round Hill Exhibit Farm becomes increasingly important: teach the thousands of visitors the importance of agriculture and illustrate the ties that bind all men to the land for basic existence.

Conceived during the development of the county's regional park system in the late 1950's, Round Hill Farm has become a favorite sightseeing and educational center for thousands of persons of all ages.

The park offers a dual advantage of recreation in the 1,100-acre site plus the feature of an operating farm, the only one of its kind open to the public without charge in Pennsylvania. Its attraction for adults is strong in nostalgic recollections of childhood experiences on a family farm. For children, Round Hill offers the opportunity to see and experience the fascinating scenes that are part of everyday life on a farm.

Here they can see a whole range of farm animals, tractors and equipment, planting and harvesting operations, and basic soil and water conservation practices.

All cropland is worked under a soil conservation plan developed by the Soil Conservation Service through the Allegheny County Conservation District. This comprehensive plan includes the rehabilitation of land that has been farmed continuously since the Revolutionary War.

Visitors can see the plan in actuality in diversion terraces, contour planting, stripcropping, crop rotation, pond development, and soil analysis.

While the farm has enjoyed great popularity since it was opened in 1968, this past year was its most active year. More than 300,000 visitors toured the farm during the year in family groups, school classes, and church and other organization groups. Numerous senior citizens groups have spent whole days at the park with a picnic lunch and a tour of the farm included in their day's activities. The small farm continues to flourish under the supervision of the Bureau of Conservation, Allegheny County Department of Parks, Recreation, and Conservation.

Parks Director George E. Kelly said that 1974 was a banner year for many reasons. "We have now developed a series of interesting programs for the farm which have made it increasingly attractive to visitors. In addition, we are using it for educational programs and projects, and we have developed a very fine rapport with all branches of the news media so that our activities are brought to the attention of a large segment of the public. Local television and radio stations, newspapers, magazines, and feature reporters have found the farm to be a refreshing, ever-changing source of human interest stories and newsworthy activities."

Perhaps the most important activity of the year is the guided tour program for school children. Some 45,000 students



Round Hill Farm in Pennsylvania offers

an 300,000 visitors a year the opportunity to see a family-sized farm in operation.



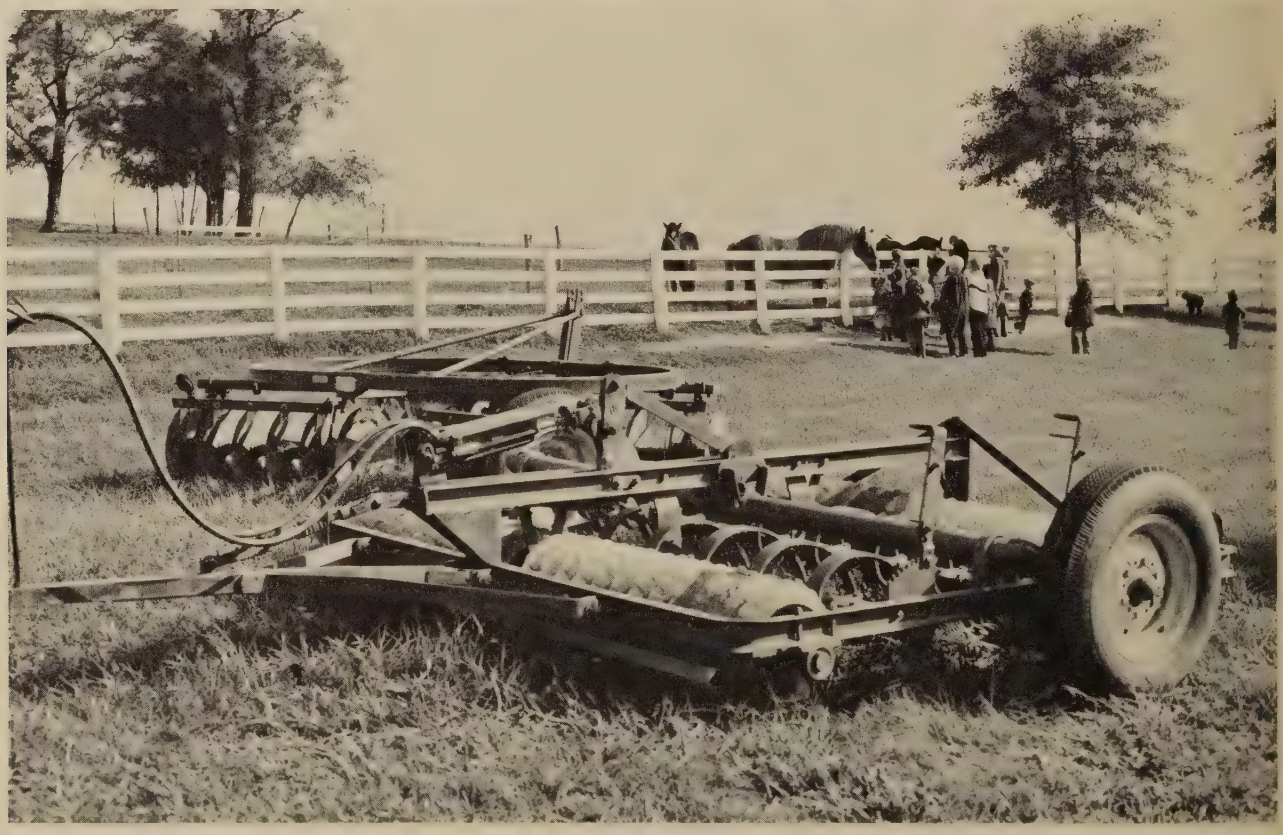
Many blind children get their first chance to "see" farm animals at the exhibit farm.



Farm Manager Bayard K. Miller checks a calf. Breeding schedules are set to provide as many young animals as possible during the peak visiting periods for school children—late spring and early fall.

from Allegheny and surrounding counties toured the farm during the year under the direction of a trained guide staff. In addition to those from local communities, student groups have come from as far away as Somerset, Pennsylvania, Morgantown, West Virginia, and Steubenville, Ohio. The visitors register indicated representatives of 33 states and 11 nations. Several of these were park representatives interested in developing exhibit farms in local or county parks.

Farm equipment is an important part of the farm tour—helping young visitors to realize the cost of operating a farm and the investment the farmer must make.



One of the most successful educational projects at the farm has been the "Day on the Farm" experience for elementary school children. In this program last year nearly 300 children from various schools in Allegheny County spent an entire day on the farm engaged in typical farm chores and harvest activities such as making cider, churning butter, husking and shelling corn, baking pies and homemade bread, preparing homemade vegetable soup, and various craft projects.

A number of developments on the farm itself were inaugurated in 1974. Corn, barley, timothy, and other farm crops were planted according to a basic crop rotation plan to provide as much farm-grown livestock feed as possible. A new cereal demonstration area was begun to illustrate the growth of rye, oats, wheat, barley, corn, and soybeans. Since cereals are the basic food of the great majority of humankind, this demonstration area will illustrate the growing process, and according to seasons, the harvesting and preparation of grain for various uses. The vegetable garden, a popular exhibit area, has doubled in size, and tips were given to visitors on planting, growing, and preserving vegetables for home consumption.

The herb garden was enlarged and a drying shed provided for drying the harvested herbs. The herb garden is planted and cared for by the Western Pennsylvania Unit of the Herb Society of America.

Some new livestock was added during the year with the birth of young animals and the purchase of surplus mature animals for market. Livestock sold at auction brought in excess of $3,000 to the county. One beef breed, the Angus, was introduced this year and two Holstein cows were added to the dairy herd. The purpose of the additions was to give visitors the opportunity to see different breeds and to provide descriptive information on their particular characteristics.



The farmhouse at Round Hill was built in 1838 and is now the farm headquarters. It will become a mid-19th century farmhouse museum when a new visitors center is completed.

During 1975 construction will begin on a new farm visitor center. Designed to duplicate existing farm buildings, the new center will include assembly rooms, exhibit and demonstrations areas, classrooms, and a replica of a one-room schoolhouse which once stood on the corner of the farm.

This new facility will allow the full development of all-weather programs scaled to the school year and incorporating

a wide range of community programs for 4-H, Grange, Future Farmers, and other groups of all ages.

Programs in gardening, orchard improvements, wool processing, experimental livestock feeding, and farm economics are planned for public presentation.

The "Day at the Farm" program will be expanded with the center's new kitchen and classroom space, extending this "hands on" experience to teachers, student teachers, and adult groups.

Upon completion the center will also serve as the farm office, allowing the present office in the original brick farmhouse (circa 1838) to be removed. Thus the farmhouse could be developed as a museum of early American farm life with period furnishings proper to allow public visitation.

The basic interpretive theme of the farm illustrates an "energy factory" in which the raw materials of sun, soil, rain, air, and minerals create the miracle of growth. Until the young citizens of America learn the lesson of this miracle and its limits, the earth that supports all life-systems will continue to suffer and decline in quality.

Round Hill Farm's role will grow in scope and significance with more programs reaching more future citizens. In an increasingly urban county, this special park will provide a living link with the history of agriculture, a demonstration of a vanishing way of life, and an opportunity to learn why and how we must husband our earth with great care. ♦

SCS Holds Workshop in Texas For Minority Contractors

The Soil Conservation Service state office in Temple, Texas, recently held its second workshop for minority and disadvantaged contractors in cooperation with the Small Business Administration.

The meeting was designed to inform minority and disadvantaged contractors of vegetative and construction contracts available through SCS-related work. The Small Business Administration, U.S. Department of Commerce, helps small contractors qualify for such contracts.

In addition to prospective contractors from various parts of Texas, the meeting was attended by members of the Coalition Group, San Antonio; the Urban League, Dallas; and the Office of Minority Business Enterprise, Austin. Representatives of the Veterans Administration in Temple also explained contracts available through their agency.

Working closely with the Small Business Administration under Section 8(a) of the Small Business Act, Maurice W. McNeese, head of administrative services at the SCS state office, said that three contractors were presently doing work for SCS under this program.

'Conservation Farming Is the Best Therapy We Have Found'

by John Badger and Dick Barber

Soil conservationist and information officer, SCS, Albuquerque, New Mexico

He came to Rio Arriba County, New Mexico, from Munich, Germany. He brought with him 35 years of experience in social work. North of Espanola, in the vicinity of Alcalde, he founded Santa Maria El Mirador, a home for mentally handicapped young men.

The man is Rev. Dom Cyrillos, the only monk in the United States of the Orthodox Order of the Knights Templar, which has its main house in Munich, Germany. From a meager beginning in 1968, his venture has grown into a 224-acre farm.

El Mirador is dedicated to the rehabilitation of human lives. One means toward this objective at El Mirador is helping and guiding young men to perform normal farm tasks. A secondary objective is to make the home completely self-sufficient. Through an agreement with the

East Rio Arriba Natural Resource Conservation District, the Soil Conservation Service helped Father Cyrillos develop a conservation plan for the farm.

The plan includes a conservation cropping system to produce organically grown grain and other food products for use at the home. Plans are underway to improve irrigation systems. Irrigation water will be applied at proper intervals and in the right amounts to meet the needs of the soil and the crops being grown. With these techniques, Father Cyrillos has caused his once low producing land to produce bountifully. He hopes his success is great enough to serve as an example to other farmers in the vicinity.

But the farm serves yet another purpose.

A young man plants a seed and watches it grow. He cultivates, waters, and cares for it. The young man harvests the fruit. He grinds the grain, making it into flour or meal.

Others plant a pasture. They water and care for grasses and legumes which spring forth. Cows graze the pastures under the care and management of the boys.

Still others milk the cows. And there is sustenance for their physical needs.

But physical sustenance is only a byproduct of Santa Maria El Mirador. The real sustenance is expressed by Father Cyrillos:

"The boys are acquiring their own human dignity and a sense of well-being. Through their learning and work, they are realizing the real meaning of accomplishment. These attitudes do not come from traditionally operated programs for the retarded.

"Everything that is done on the farm is approached from a conservation standpoint," says Father Cyrillos.



Father Cyrillos provides instruction at one of the greenhouses at El Mirador.

"Even before we learned there was a conservation district, we tried to practice conservation and we did a pretty good job of growing our gardens.

"We're interested in wildlife, too. We have a wildlife habitat planting planned for this summer. We will plant and care for it as an experimental test plot. We expect this to bring in more birds and small animals. We're sure this will benefit our farm and we know it will be good for the boys.

"We have plans to build a new house. We plan to develop a vineyard and to produce cheese on a small scale. Other agricultural products, surplus to our needs, will be sold. Each of the young men in the home will receive a portion of the income. He will later be given the opportunity to voluntarily contribute to a fund to establish other homes. What better goal in life than a second home; a home devoted to conservation and self-sufficiency for those whose mental capacities have been hampered.

"And what better way to do it than by being watchful stewards of the small portion of the good earth that has been entrusted to our care. Conservation farming is the best therapy we have found." ♦

RC&Ds—
Regional Organizations Solve Tough Resource Use Problems

by Dick Lehnert

(Reprinted with permission from the ***Michigan Farmer***, February 1975)

Forty-two of Michigan's 83 counties are now within the boundaries of operating Resource Conservation and Development (RC&D) projects or are thinking about forming one.

What's an RC&D? Despite the fact a lot of people are included within one, they remain hard to define and among more nebulous entities.

The U.S. government, which authorized the creation of RC&D's, has a definition that goes like this: "An RC&D project is a locally initiated and sponsored activity that provides an opportunity for local people in an area to develop the natural and related resources to meet their needs and objectives, improve the economy, and provide a better place to live, work and play."

That definition really doesn't do much to explain why any organization should gain so much support. Perhaps a good description would be, RC&Ds are able to add apples and oranges and get fruit. It lets you add unlike things together and get results.

RC&Ds are a curious combination of people, personalities, proposals, and projects, of institutions and ideas and agencies, who try to work together when normally they might not.

Don McArthur, assistant state conservationist in charge of RC&D programs in Michigan, admits "It's hard to get hold of the RC&D concept."

People who worry less about concepts and definitions and more about progress find that RC&Ds will solve these kinds of problems—when virtually nothing else does.

1. *Regional problems* too hard to get at with other units of government because they cross jurisdictional lines;

2. *"Not my" problems* too hard to get at because no agency agrees the solutions are its responsibility;

3. *Red tape problems* too difficult for people to fight through without help;

4. *Jealousy problems,* those that never get solved because people can't agree on priorities of who should go first. Among other things, RC&D's are trading posts.

At the beginning of 1973, there was one RC&D project in operation in Michigan, the Northwest RC&D. Covering 13 counties in the northwest Lower Peninsula, it is highly regarded nationally as one of the more effective problem solvers and work accomplishers.

In 1973, the Upper Peninsula RC&D project was approved.

Then came Huron Pines, in April last year, covering eight counties in the northwest lower peninsula.

Sauk Trails RC&D, which will cover Van Buren, Berrien, and Cass Counties, is awaiting approval from the U.S. Department of Agriculture.

Don McArthur believes one attraction of the RC&D is they are natural resource oriented. They exist, by law, within the same lines as regional planning and development commissions.

The regional planning and development commissions work with problems of crime, health care, the aging, manpower, transportation, and the railroads. With these problems, constant efforts are needed to keep vigilant fingers in dikes on which the pressure always seems to get stronger.

But within the RC&Ds, you can promote an industry, create

a park, or beautify a shoreline, actions with visible and lasting effects.

When Congress created the RC&D program in 1962, it authorized money for technical and financial assistance to legal sponsors. If the money were the most important part, the program might not have flown. Congress allocated only about $25 million last year for the 120 RC&Ds nationally.

Where Congress really scored was in choosing those "legal sponsors." Each RC&D may have many endorsers, but it must have the sponsorship of every soil conservation district and every county board of commissioners within the RC&D. Several other Federal agencies may receive money to assist RC&Ds—the Forest Service, the Soil Conservation Service, Farmers Home Administration, the Cooperative Extension Service.

McArthur said the RC&D program is not a grant program, but matching funds are available for some actions—50 to 100 percent RC&D, completed by local money. Actually, however, Washington counts as "local money" anything that isn't Federal. Some local communities have found money from state agencies, and many times these agencies undertake RC&D actions as if they were glad to get the tip that







An RC&D water-based recreation measure near Northport, Michigan, includes picnic sites, restrooms, a scenic overlook, and steps to the beach (top photo). Rock riprap and log structures installed through a Northwest Michigan RC&D measure protect the streambank from erosion along the Betsie River (center). A fishing village development in Leland, Michigan, is the work of an RC&D measure in the Leelanau Soil Conservation District (bottom photo).

the problems existed.

"Two-thirds of the value comes from a bunch of local people getting together and working to get something done," McArthur said.

In some cases, the desire to do something was there and people went the RC&D road to do it. In Sauk Trails, for example, the orientation is largely toward farmers.

Farmers there wanted to do something to expand agricultural opportunity. Tally Richards, the Cass County Drain Commissioner, was elected chairman of the RC&D Council, and even before approval as a operating RC&D, the group was laying plans.

There are a lot of grapes in Van Buren and Berrien Counties, Richards said, but there are none in Cass County. With the boom coming in grapes and the French hybrid wine grapes looking good in Michigan, they wondered whether the area's full potential was being used.

So the Sauk Trails first action is a grape site inventory in Cass County.

Similarly, Huron Pines RC&D was motivated by a high priority need. Authorized in April 1974, only 4 months later it let contracts for $56,000 to assist county road commissions in controlling roadside erosion.

In both the Upper Peninsula and the Northwest RC&Ds, however, the orientation was more general, leaning toward forestry and recreation needs. The Northwest RC&D has a national reputation for its water-based recreation work, but it has been into many things—having more than 500 project proposals. Similarly in the Upper Peninsula, forestry improvement gives a major impetus, but hundreds of proposed projects cover every kind of activity—including a buffalo herd improvement project proposed by American Indians of the Keweenaw Bay Tribal Council.

It has been 7 years since the people of northwest Michigan began creating their RC&D. It took almost 2 years after planning began, but in September 1969, the Northwest Michigan Resource Conservation and Development Project officially began.

Last year, it was named as one of the five most effective in the Nation, of 120 in operation, in getting things done.

At the beginning, it took a lot of people working together to get it moving. To get a 13-county RC&D established requires the cooperation of a minimum of 26 county-level groups—not to mention the approval of the Governor, Congress, the U.S. Department of Agriculture, and the Soil Conservation Service.

A good portion of this organization work is done by the project coordinator, and in northwest Michigan he is James R. Callison. He's been with the project since November 1968, when planning got off the ground.

Callison's job, in a nutshell, is to find what people want and help them get it. He finds who has money, know-how, technical ability, and manpower. He tries to get everything to mesh, to make it all work together.

Russell Gingrich, Reed City farmer, is chairman of the Steering Committee of the Northwest RC&D Project. His involvement came through his longtime activity in the Osceola County Soil Conservation District.

"In a lot of our work, many agencies have been coordinated on one action," Gingrich said. Before the RC&D was created, it was hard to get them to work together, he said.

Gingrich feels the RC&D has drawn the people of the northwest together. Experiences, he said, have shown people how interrelated they are.

"A lot of people questioned the value of soil surveys. They thought they benefited only farmers, but once you have the surveys, everybody seems to use them," Gingrich said.

The soil survey example is a good one, not only of how the RC&Ds have been helping peo-

A demonstration of mulching to stabilize roadbanks was sponsored by the Charlevoix County Road Commission and SCS through the Northwest Michigan RC&D Project.



ple get things done, but of the amazing cross fertilization of ideas.

"Initially, a soil survey was authorized for Manistee County," Callison said. "Then we decided to redo Antrim, since the map was old and details had changed since it was last done in 1923."

Using new aerial photos and old information, plus a lot of ground information, people began to see that the more detail that could be added, the more useful the maps would be.

Interpretations of the maps began. One of the first fruits was a book called "Red tart cherry site inventory" for all of Grand Traverse County. It's a book of maps, maybe 50 of them, evaluating the fruit site potential of every square foot of the county. And new ones are being done for other counties.

"I can't help but think, what if our grandfathers had tools like cherry site inventories," Gingrich said. "It sure would have saved a lot of work and heartbreak. We cleared a lot of land here in northwest Michigan that, we now know, we never should have cleared for farming. Now we have this information at our fingertips."

Some of the modern-day applications of soil surveys are in land use planning. For example, cherry trees require high sloping sites. Such sites often overlook water. Such sites also make the best building sites. Planners now have this information to help them when choices must be made.

Soil surveys also help avoid the problems that come when people spend their life savings for a retirement lot on which to build a home—only to find the soil won't deliver an adequate percolation test for the septic tank and drain field.

Gingrich feels the RC&D works well. "Some people who see problems get discouraged," he said. "It takes so long to get things done. They see Federal agencies doing more paper shuffling than anything.

"When we started this project, we asked all areas and communities, townships and counties, and cities, to get proposed actions to us.

"We accepted them all, even some 'crackpot' schemes that had been kicking around for years. Some may never get any action—but some were done with no formal action at all from the RC&D." Sometimes just having a forum to air a problem gets wheels rolling.

"You need total cooperation for these things to work," Gingrich said. He credited Callison with "having a knack to get people to work together."

In the northwest, many of the initial actions fell into the general area of "critical area planting." These projects took place on land that, if it were farmland, would have been eligible for normal erosion control measures in which the farmer and the government would have cost shared.

But in the northwest, much of this land was publicly owned or in private nonfarm hands. Since the actions started, about 1,000 acres of such land per year have been protected: Beaches and dunes have gone into beachgrass; wildlife plantings and shrubs have gone into sandy areas.

In most of these cases, the machinery was available but never applied to these tasks precisely. There were cooperative actions of soil conservation districts, the Agricultural Stabilization and Conservation Service, the Soil Conservation Service, and private landowners. The State Department of Natural Resources and the U.S. Forest Service also were involved.

Streambank stabilization was given high priority. The Betsie, the Big Sauble, the Hersey, the Cedar, the Pere Marquette, the Big Bear, the Maple—all these rivers are in line or finished with projects designed to increase their recreational value while reducing bank erosion and other damage problems from high usage.

Parks have gone in at Evart, Elk Rapids, Boyne City, and in

(continued on p. 24)

These steps, built as an RC&D measure, lead up from a beach on Lake Michigan to picnic and overlook areas and prevent erosion caused by people climbing or sliding on the steep slope.



Recon . . .

Soil surveys

SCSers in Wellsboro, Pennsylvania, were among the more than 225,000 Federal employees recognized in 1974 under the Federal Incentive Awards program. The **Civil Service Journal** notes members of the SCS office there were extremely effective in helping farmers, townspeople, and communities recover from the massive flood damage caused by Hurricane Agnes and shared an award of $1,000 for their outstanding efforts in repair of the flood damage.

Fish farms. The Soil Conservation Service's 1975 summary of fish farming shows acreage in trout, catfish, and minnow farming decreased slightly more than 20 percent compared with the 1974 average. As of March 14, 1975, enterprises involved in commercial production of fish numbered 5,146 and covered nearly 125,000 acres. Catfish farming enterprises numbered 1,934 and covered 46,440 acres plus 1,200 linear feet in raceways; trout farms numbered 663 and covered 1,913 acres plus 15.7 million cubic feet in raceways; and minnow farms numbered 790 and covered 40,255 acres. The number of fee-fishing enterprises was nearly 3,950—about 200 more than last year, but acreage was 42,700—nearly 21,000 fewer acres than in 1974.

Arkansas

Jackson County. By Warren A. Gore. 1974. Soil Conservation Service in cooperation with Arkansas Agricultural Experiment Station. 74 pp. illus.; maps.

Colorado

Boulder County Area. By Donald C. Moreland and Ronald E. Moreland. 1975. Soil Conservation Service in cooperation with Colorado Agricultural Experiment Station. 86 pp., illus.; maps.

Indiana

Boone County. By Karl H. Langlois, Jr. 1975. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 56 pp., illus.; maps.

Harrison County. By John M. Robbins, Jr. 1975. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 78 pp., illus.; maps.

Vigo County. By Robert H. Montgomery. 1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 121 pp., illus.; maps.

Missouri

Lafayette County. By Allan H. Jeffrey. 1975. Soil Conservation Service in cooperation with Missouri Agricultural Experiment Station. 67 pp., illus.; maps.

Montana

Carbon County Area. By John L. Parker, Gordon L. Decker, Laverne Gray, and Oscar Muller. 1975. Soil Conservation Service and Forest Service in cooperation with Montana Agricultural Experiment Station. 137 pp., illus.; maps.

New Mexico

Tucumcari Area. By W. James Ross and Douglas S. Pease. 1974. Soil Conservation Service in cooperation with New Mexico Agricultural Experiment Station. 94 pp., illus.; maps.

Nebraska

Adams County. By Larry G. Ragon. 1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 78 pp. ,illus.; maps.

Wayne County. By Donald E. Kerl. 1975. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division, 61 pp., illus.; maps.

Meetings

Nevada

Fallon-Fernley Area. By William E. Dollarhide. 1975. Soil Conservation Service in cooperation with University of Nevada Agricultural Experiment Station and United States Department of the Interior, Bureau of Indian Affairs. 112 pp., illus.; maps.

Ohio

Putnam County. By Alec R. Brock and Donald R. Urban. 1974. Soil Conservation Service in cooperation with Ohio Department of Natural Resources and Ohio Agricultural Research and Development Center. 112 pp., illus.; maps.

South Dakota

Hughes County. By Miles W. Smalley. 1975. Soil Conservation Service in cooperation with United States Department of the Interior, Bureau of Indian Affairs and South Dakota Agricultural Experiment Station. 104 pp., illus.; maps.

Texas

Stonewall County. By A. R. Goerdel and Lonnie Watson. 1975. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 83 pp., illus.; maps.

May

3–4	*Sierra Club, San Francisco, Calif.*
4–7	*National Forest Products Association, Washington, D.C.*
15–16	*Southern Forest Institute, Inc., Panama City, Fla.*
18–22	*American Institute of Architects, Atlanta, Ga.*
18–23	*National Council of State Garden Clubs, Inc., Salt Lake City, Utah.*
20–23	*International Association on Great Lakes Research, Albany, N.Y.*
29–30	*Southern Forest Institute, Inc., Biloxi, Miss.*

June

1–4	*Twenty-second National Watershed Congress, Portland, Ore.*
8–12	*General Federation of Women's Clubs, Washington, D.C.*
8–13	*American Water Works Association, Minneapolis, Minn.*
15–19	*Air Pollution Control Association, Boston, Mass.*
16–20	*American Geophysical Union, Washington, D.C.*
17–20	*Twelfth National Agricultural Plastics Conference, Vineland, N.J.*
22–25	*Sixty-eighth Annual Meeting of American Society of Agricultural Engineers, Davis, Calif.*
22–25	*National Association of Counties, Honolulu, Hawaii*
23–25	*American Plywood Association, Vancouver, Canada*
24–28	*Association of Consulting Foresters, Greenville, Me.*
26–27	*Southern Forest Institute, Inc., Asheville, N.C.*
29–July 3	*American Seed Trade Association Convention, Houston, Tex.*
30–July 3	*National Environmental Health Association, Minneapolis, Minn.*

July

3–8	*National Education Association, Los Angeles, Calif.*
13–17	*Seventy-fifth Annual Meeting of American Society of Landscape Architects, San Antonio, Tex.*
19–23	*American Association of Nurserymen, Inc., Chicago, Ill.*
20–24	*National Federation of Business and Professional Women's Clubs, Inc. of the USA, Las Vegas, Nev.*

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

U.S.MAIL

CONTROLLED CIRCULATION POSTAGE
PAID IN WASHINGTON, D.C.
AGR 101

MOVING? Send present mailing label and new address, including zip code, to SOIL CONSERVATION, SCS, U.S. Department of Agriculture, Room 6205, Washington, D.C. 20250.

(continued from p. 21)
LeLand Township of Leelanau County (Peterson Park).

Sewer and water planning for all 13 counties is underway. Farmers Home Administration funds here will bring central water systems and modern, unpolluting sewer facilities to all communities.

Callison emphasized that these will be "special." Being planned on a regional basis, there will be no duplication of effort; plans for one area will be directly applied to others.

The staff of the Northwest RC&D Project includes a forester, Bill Botti, who is working to expand wood using industries. He's facing a task of getting the cooperation of many private owners who are absentee landowners.

Dick Larson and Don Buchanan are the area soil scientists who apply SCS techniques and are creating soil inventory maps of many kinds. They're particularly proud of the cherry site inventory map, for not only did it involve their knowledge, but also required the input of the Cooperative Extension Service, where agents had knowledge of the kind of farm uses presently undertaken, and the weather bureau, to say what potential a site had from that viewpoint.

"I think this will be expanded to many crops," Callison said.

The Northwest RC&D Project, when created, had 577 action proposals. Of those, 519 are now active—in some state of action or completed.

McArthur feels RC&Ds are now being put together slightly differently than many of the early ones. Less emphasis is being placed on individual action proposals and more on identifying needs and opportunities that blend into a central theme and direction for the whole RC&D project. Then with this direction, priority is set by the council on actions to be taken.

1.6
So3S

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / June 1975



The Eyes Have It

Over four decades the Soil Conservation Service has significantly added to the beauty of the landscape:

—Green woodlands cover once scarred red hillsides;

—Native grasses, windbreaks and shelterbelts have replaced a barren, shifting dust bowl;

—Colorful contour strips add variety to the landscape;

—Farm ponds and watershed lakes give new mirrored highlights to the rural scene.

The eyecatching appeal of most conservation work used to be mainly an unexpected side benefit. Our eye was focused mainly on preventing soil erosion, floods, and sediment; improving wildlife habitat; and increasing crop yields.

Today we realize that appearance must be considered neither frill nor accident. It is as much an indicator of environmental quality as any other consideration. SCS today systematically includes visual quality in all its work. Our professional engineering staff now includes three landscape architects. Policy statements and guidelines on conserving visual quality are being produced.

The main SCS guideline is that a plan for landscape management in conservation activities must be more than a planting guide. Functional use of plantings (including some developed at SCS plant materials centers) can aid visual quality of conservation work by:

—Controlling soil erosion;

—Screening distracting views, such as ongoing construction or finished works that can't themselves be made visually attractive;

—Helping guide people's glances toward lake areas or other sites;

—Visually connecting existing woodland edges or reducing the negative impact of straight-edge woodland and waterways;

—Providing shade, food, cover, travel lanes, and homes for wildlife; and

—Helping control foot traffic around recreation areas.

Yet attractive plantings alone are not enough. Visual quality must be a factor in deciding:

—Where conservation structures should be placed;

—What size and shape they should be;

—What kinds of materials should be used in building them; and

—Whether the practice would indeed be an "improvement" at all.

Conservation practices then must be installed in a way that will be as visually attractive as possible during and after construction. We will need to help local people and conservation districts evaluate the visual quality of each site and choose alternatives for achieving the best esthetic appeal. We must also help people understand what conservation measures will look like in place. If, after construction, the land user says, "That's not what I expected at all," we have failed to communicate what to him may be one of the most important facts about the practice or the structure.

Kenneth E. Grant

SOIL conservation

Contents

June 1975, Vol. 40, No. 11

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in transaction of public business required by law of this Department. Use of funds for printing **Soil Conservation** has been approved by the Director of the Office of Management and Budget through July 31, 1978.

Earl L. Butz
Secretary of Agriculture

Kenneth E. Grant, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission
Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names
Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions
$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

2 From the Administrator

4 Alaska's Diversity: A Challenge for Its New Plant Materials Center
Wayne Burleson

7 He Manages His Range 'To Meet Any Emergency'
Allen R. Temanson

8 Conservation Editions on the Rise in Kansas
Fred Trump

9 Recipe for Beef
Robert Bauer

10 'Second Career' of an Ohio Farmer
Leigh D. Mantell

12 Recreation on the Rise in Watershed Projects
Hans G. Uhlig

14 Texas 'Tryouts'
Gary Westmoreland

16 Land Use Control: The Black Hawk County Experience
Louise A. Lex and Louis Lex, Jr.

19 Re-Creating Early Texas Landscapes
Jacob C. Garrison and Lynn Pace

22 Recon . . .

22 Soil Surveys

23 Meetings

COVER: Small watershed projects, such as this one near Timpanogos Mountain in the Alpine Soil Conservation District in Utah County, Utah, are attracting more and more visitors for recreation each year. (See story on page 12.)

Alaska's Diversity: A Challenge for Its New Plant Materials Center

by Wayne Burleson

Administrative specialist, SCS, Anchorage, Alaska

From the rather distant perspective of the lower 48 states, Americans might think of Alaska as a treeless iceland, lacking diversity.

Yet Alaska is a huge and diverse land mass more than 2,400 miles wide, about the same distance as between Savannah, Georgia, and San Diego, California. There are four time zones between Tongass in southeastern Alaska and Point Hope on the Chukchi Sea. Annual precipitation varies between 4 inches and more than 300 inches. Temperature extremes of —75° to +99° occur.

This tremendous diversity of conditions creates great problems in protecting Alaska's environment as the state's resources are developed. Major environmental problems have been created by the Trans-Alaska Pipeline, an accelerated highway construction program, and urban and industrial expansion.

Alaska's state government is responding to the challenge of environmental protection through a variety of actions. Perhaps the most basic is the establishment of a plant materials center to develop the necessary vegetative materials for conservation, agriculture, and industry.

In 1972, the Alaskan Legislature directed the Department of Natural Resources (DNR) to establish a plant materials center in the Matanuska Valley. Operating funds were made available in January of 1973, and 285 acres with several buildings were purchased for the new center 11 miles south of Palmer.

Through the Intergovernmental Personnel Act, James R. Stroh, who had been manager of the Soil Conservation Service plant materials center in Bridger, Montana, was selected to become manager of the new state center. As manager of the Alaska Plant Materials Center, Stroh's primary responsibilities are the establishment of the physical facilities for the center, development of the plant testing and production program, projection of that program for a 10-year period, and the training of the professional staff to carry out that program. In addition, he carries out some of the plant collection, plant evaluation, and development work itself.

The Alaska Plant Materials Center was located in the Matanuska Valley because of the proximity and access to the DNR's Division of Agriculture headquarters in Palmer. The division is in direct charge of the center. There were other advantages to the location.

Matanuska Valley has an established agriculture. The soils and climate were known to be suitable to diverse crop production, and access to commodity, equipment, and

Jim Preston, SCS district conservationist in Homer, Alaska, looks at polar brome growing at the Alaska Plant Materials Center in Palmer.



service facilities was established. The plant materials center, however, serves the entire state.

Because of Alaska's diversity of climate, soils, vegetation zones, and plant materials needs, substations or even additional centers may become necessary as the state develops.

The Matanuska Valley is a primary agricultural area in the state, chiefly by virtue of the strong federal influence in colonization of the area in the 1930's and the attendant publicizing of that effort. There are several other areas of potential agricultural development across the state which have not as yet received such intensive government support.

"At the moment, the only plant materials intentionally excluded from our testing program are mosses, lichens, and algae," Stroh explains. "Every other species of native plant is eligible for inclusion. Selected species not native to Alaska are also being tested and we are especially interested in plants from Canada, Scandanavia, and the Soviet Union. Nor would we exclude collections from above 50° latitude in the southern hemisphere.

"The legislature has directed the center to develop new plant materials for 'agriculture, conservation and industry' and its intent is to provide suitable plant materials for whatever needs may arise for them. The scope of this endeavor, then, is far broader than any of the federally operated plant materials centers.

"In addition, the Alaska center is directed to develop and support the state's emerging seed stock and plant propagation industries by providing foundation seed and planting stock of all released plant varieties grown in Alaska to commercial producers. These will eventually include forest trees, grains, forage plants, vegetables, fruits, and ornamentals in addition to conservation plants."

Drawing on SCS experience through the services of Stroh benefits the Alaska DNR by providing expertise in plant materials center development and operations; the avoidance of major pitfalls in procurement, budgeting, and organization; and by providing training for the new staff.

The Alaska center also is able to readily obtain and evaluate promising plant materials from SCS plant materials centers.

Together, this will insure that new plants are provided for agriculture, conservation, and industry most rapidly. And it will preclude the losses of any plant varieties already released but not available to the public due to lack of facilities.

The Soil Conservation Service is an official cooperator in the plant materials center program. The conservation program of SCS in Alaska will benefit directly from this state work, because the plant materials SCS needs will become available.

Finally, the existence of a local functioning plant materials center provides a focal point for many state and federal plant-oriented agencies to coordinate their individual efforts in conservation by virtue of a single common source of plant materials for all needs. ♦

He Manages His Range

'To Meet Any Emergency'

by Allen R. Temanson

District conservationist, SCS, Killdeer, North Dakota

"History has a way of repeating itself, and we should profit by our past performances. However, we usually become complacent and forget what happened in past years, remembering only the good." That's why Tony Stroh, a rancher and conservationist near Killdeer, North Dakota, believes that resource management is extremely important in western North Dakota. The history referred to is the weather cycle of wet and dry years.

"I try to manage my range to meet any emergency that occurs. This includes years of short rainfall and minimal growth of native grasses," Stroh explains. He farms and ranches 2,400 acres, including 480 acres of leased land, in Dunn County. Purebred Hereford cattle are his major operation.

After Stroh obtained the ranch and decided on a livestock enterprise, he seeded cropland to grass for tame pasture and hay production. To date, he has seeded approximately 750 acres to permanent grass and legumes. He also seeds rotation hay in cropland strips to provide adequate forage for winter feeding. The grazing of tame pastures in early spring has delayed the need for use of native range until June or July. This delay has greatly enhanced the growth and vigor of key species of grasses such as green needlegrass, western wheatgrass, and big bluestem.

The cropland is all in stripcropping patterns, either contour or wind strips. Along with the stripcropping system are pattern-type field tree belts, grass buffer strips, diversions, erosion control structures, and grass and legumes in rotation. Corn is raised and cut for silage to provide necessary roughage for wintering feeder calves.

Stroh has planted livestock shelterbelts at five locations in his native pastures.

"In the cattle business I feel it's essential that I give my livestock all the protection and comfort I can. These shelterbelts may save a portion of my herd from some winter storm," he said. "I also believe that plenty of water is essential for proper grazing, and cattle gains are appreciably better where adequate water is available.

"The cycle of wet and dry years will continue coming and going. We have to anticipate prolonged drought and manage our resources in the expectation that this is the year when it will start. I usually carry over about a year's supply of hay and enough grain to manage for a year or two," he said.

Stroh has been a district cooperator with the Dunn County Soil Conservation District since he started ranching in 1950 and has been under the Great Plains Conservation Program since March 1966. He is vice president and a director of the North Dakota Hereford Association.

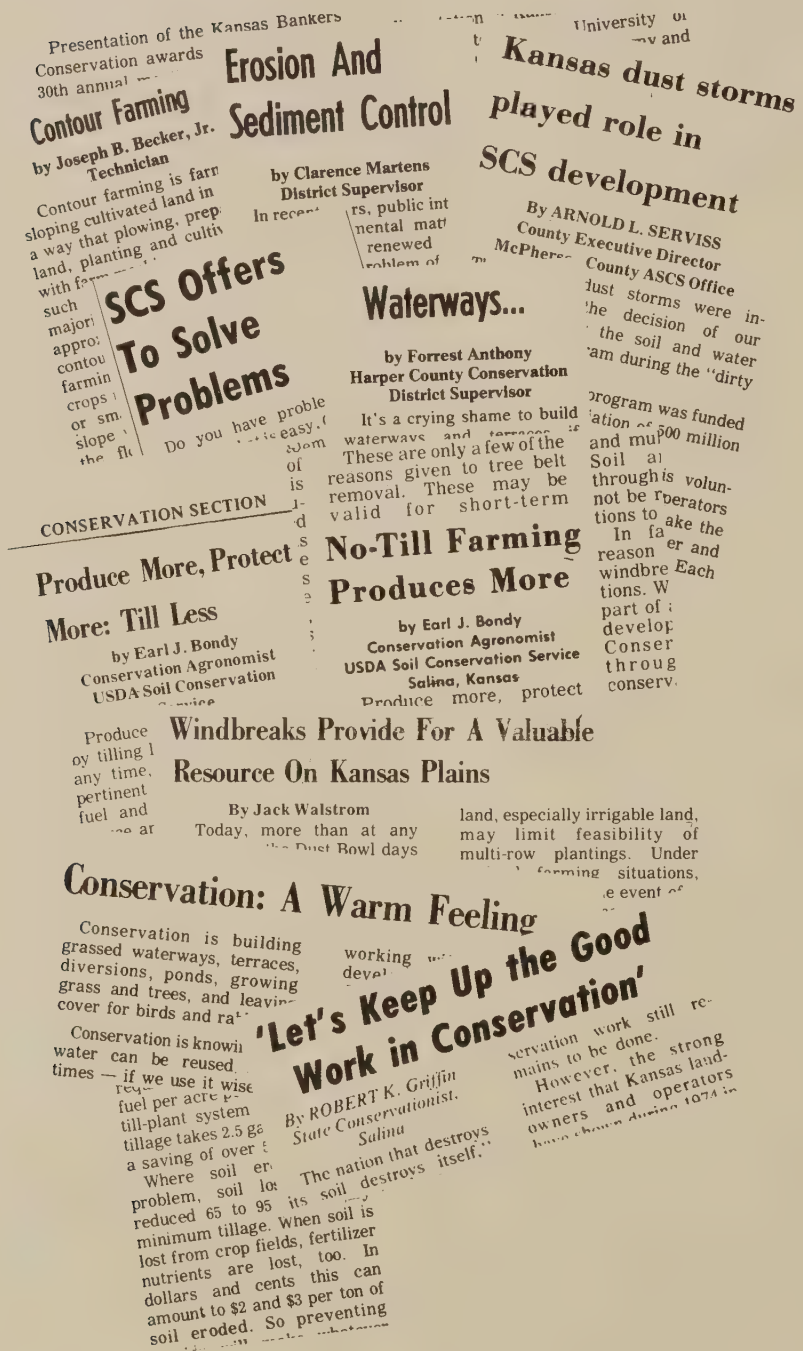
Stroh has also provided one strip of cropland to be used by the Dickinson Experiment Station as a trial plot for grain varieties. This has given the area a first-hand knowledge of the adaptability of various varieties to local climatic conditions.

The West River of North Dakota will not again become the Great American Desert if Stroh and operators like him are managing its resources. ♦

Conservation Editions on the Rise in Kansas

by Fred Trump

Information officer,
SCS, Salina, Kansas



Presentation of the Kansas Bankers Conservation awards 30th annual

Erosion And Sediment Control

by Clarence Martens
District Supervisor

Contour Farming

by Joseph B. Becker, Jr.
Technician

Contour farming is farm sloping cultivated land in a way that plowing, prep land, planting, and cultiv with fa such major appro contou farmin crops or sm slope the fi

SCS Offers To Solve Problems

Do you have proble

CONSERVATION SECTION

Kansas dust storms played role in SCS development

By ARNOLD L. SERVISS
County Executive Director
McPhers County ASCS Office

dust storms were in- the decision of our the soil and water am during the "dirty

Waterways...

by Forrest Anthony
Harper County Conservation District Supervisor

It's a crying shame to build waterways and terraces These are only a few of the reasons given to tree belt removal. These may be valid for short-term

program was funded ation of 500 million and mu Soil a through is volun- not be operators tions to ake the In fa er and reason windbre Each tions. W part of develop Conser throug conserv

Produce More, Protect More: Till Less

by Earl J. Bondy
Conservation Agronomist
USDA Soil Conservation

No-Till Farming Produces More

by Earl J. Bondy
Conservation Agronomist
USDA Soil Conservation Service
Salina, Kansas

Produce more, protect

Produce oy tilling l any time, pertinent fuel and

Windbreaks Provide For A Valuable Resource On Kansas Plains

By Jack Walstrom

Today, more than at any Dust Bowl days

land, especially irrigable land, may limit feasibility of multi-row plantings. Under forming situations, e event of

Conservation: A Warm Feeling

Conservation is building grassed waterways, terraces, diversions, ponds, growing grass and trees, and leavin cover for birds and ra

working w devel

Conservation is knowi water can be reused times — if we use it wise fuel per acre till-plant system tillage takes 2.5 ga a saving of over Where soil er problem, soil lo reduced 65 to 95 minimum tillage. When soil is lost from crop fields, fertilizer nutrients are lost, too. In dollars and cents this can amount to $2 and $3 per ton of soil eroded. So preventing

'Let's Keep Up the Good Work in Conservation'

By ROBERT K. Griffin
State Conservationist,
Salina

"The nation that destroys its soil destroys itself."

servation work still re- mains to be done. However, the strong interest that Kansas land- owners and operators

Soil and water conservation is alive and well in Kansas.

This fact is evident not only as one flies across the state, but also in the support Kansas newspapers give to conservation programs.

During the first 3 months of 1975, Kansas newspapers published 68 special conservation editions, indicating strong public support for conservation work. The editions are published in conjunction with the annual meetings of the state's 105 conservation districts. State law requires these meetings be held during January and February.

A typical outstanding edition is that of the Fort Scott Tribune. It was published in tabloid format, although most of the conservation editions use regular newspaper format. The front page featured a full-page picture and articles in the issue included five by SCS personnel and three by conservation district supervisors.

The editions vary greatly around the state. The Burlington Daily Republican's conservation edition stretched out over 4 days; the Hiawatha Daily World published aerial photos of the farms of the five Banker's Award winners on the front page.

Subject matter and variety are strong points in the conservation editions. Most contain a good mix of feature articles about Banker's Award winners as well as articles by district supervisors, local, area, and state SCS personnel, Agri-

cultural Stabilization and Conservation Service personnel, and Cooperative Extension Service personnel.

The SCS state office each December sends five or six feature articles to SCS field offices for consideration in the conservation editions. A feature article by the state conservationist, for example, appeared in 32 of the conservation editions, and articles by both the conservation agronomist and range conservationist each appeared in nearly 30 editions.

Soil and water conservation is mighty important in a state that has 49 million acres of agricultural land. Fifty-eight percent of this land has conservation plans and about half of the agricultural land has conservation treatment completed. The depth and strength of grassroots support for conservation in Kansas is evident in the interest shown by many of its 240 weekly and 50 daily newspapers.

Most of the medium-sized newspapers publish a conservation edition annually—and the number of such editions is growing each year. ♦

Recipe for Beef

by Robert Bauer
District conservationist, SCS, McClusky, North Dakota

Take adequate water and grass, stir in a good portion of proper management, and feed to high quality cows. That's the recipe Lewellyn Tewksbury of Mercer, North Dakota, has been using to increase the amount of beef he sells.

Tewksbury, a cooperator with the Sheridan County Soil Conservation District and a holder of a Great Plains Conservation Program contract, changed his operation from a diversified unit to just about a straight livestock unit.

He did this after facing two main problems: much of his rangeland was unevenly grazed due to lack of watering facilities and inadequate fencing, and much of his cropland was marginal and eroding.

A cooperator since 1961, Tewksbury faced that year the fact that his rangeland had been burned in a grass fire started by lightning. The wetland areas had been overgrazed and the grass was poor. Tewksbury seeded these wetlands areas, about 45 acres, to reed canarygrass and got an excellent stand.

On marginal cropland where he had gotten low small grain yields, he seeded 270 acres to grass for pasture. He also installed adequate watering facilities on his 1,340 acres of rangeland and cross-fenced it so that no pasture had more than 320 acres.

Tewksbury now uses native rangeland only for summer and early fall grazing. Tame pastures, mostly crested wheatgrass, are used for spring and late fall grazing.

On his remaining cropland, he maintains 50 acres of alfalfa for hay and seeds 50 acres of wheat on summer fallow with sweetclover, and the remaining acres to oats for hay and grain.

"The seeding of marginal cropland to grass has certainly paid off," according to Tewksbury.

"I am now able to keep my livestock off native grass until early summer. Seeding the native wetlands has also aided in giving the warm-season grasses a chance to grow while the cattle are grazing the reed canarygrass.

"Even with the lack of rainfall last summer, my mature cows, 5 years or older, gained 55 pounds. My average weaning weight has increased 92 pounds since I started using good grass management and livestock selection."

Tewksbury reduced water erosion both through seeding marginal cropland to grass and installing two grassed waterways on the remaining cropland to take excess water from the fields.

Overall, Tewksbury's conservation plan included grassed waterways, grass seeding, cross-fencing, livestock water developments, field windbreaks, farmstead and livestock windbreaks, proper grazing use, crop residue use, and pasture and hayland management. ♦

'Second Career'

Of an Ohio Farmer

by Leigh D. Mantell

District conservationist, SCS, Ottawa, Ohio

Born and reared in the country, Richard Bowers had spent his life farming until 1960. That year, he lost the cash-rented land which produced most of his living. Even in the rich agricultural area of northwest Ohio, Bowers couldn't make a living on his 65 acres.

Bowers looked for off-the-farm work. But his trek from factory to factory proved discouraging. He found only closed doors.

Then, the Putnam County farmer began a second career working with the soil—a career that has been so successful it's put him back into farming on an even larger scale than before.

It started with the purchase of a backhoe, one of the first in the area. With a natural aptitude for using machinery and an almost spiritual admiration for the outdoors, Bowers picked up odd jobs repairing broken tile lines, putting in septic tanks, and burying rock piles.

Then, in 1963, the Soil Conservation Service began to work with erosion control structures in Putnam County. Bowers knew the land, had ability with machinery, and was available.

"I was asked if I would be interested in putting in a structure for my cousin, Bob Bowers. It was a new experience for all of us," he explains.

The drop inlet offered considerable potential for controlling erosion along the many miles of open drainage ditches in the county. It was a practical device badly needed to lower surface water from the broad, gently sloped surface ditches into stream channels without leaving costly and damaging erosion.

"At first it was a slow, back-breaking process as it is with any new product," reminisces Bowers.

In the early days, it took 2 to 3 days to put in one of the structures made of concrete blocks.

Time was spent hauling machinery, equipment, and materials such as concrete blocks, pipe, mortar, water, and steel reinforcing rods a quarter of a mile or more to a distant part of the farm. The backhoe, used only for a few hours work altogether, was tied up on the site the entire time, making it difficult to pick up additional money doing other jobs.

"If the job was halfway in and it rained, you had a real mess on your hands," said Bowers.

Trying to come up with something more practical and to provide work during idle winter months, Bowers hit on the idea of a precast concrete structure.

Through trial and error and hard work, he refined his precast structures and progressed from the original oil drum molds to 3/16-inch sheet metal forms which are easier to work with and result in a product much easier to install.

Another obstacle stood in the way before the structure business could really start booming.

"Local farmers weren't interested in putting in structures unless they could get surface drainage," states Bowers.

A lack of qualified contractors in the county encouraged Bowers to purchase some earth-moving equipment for his farm tractor. With this equipment, he could now install the shallow surface ditches badly needed by many Putnam County farmers to drain their tight, heavy clay ground.

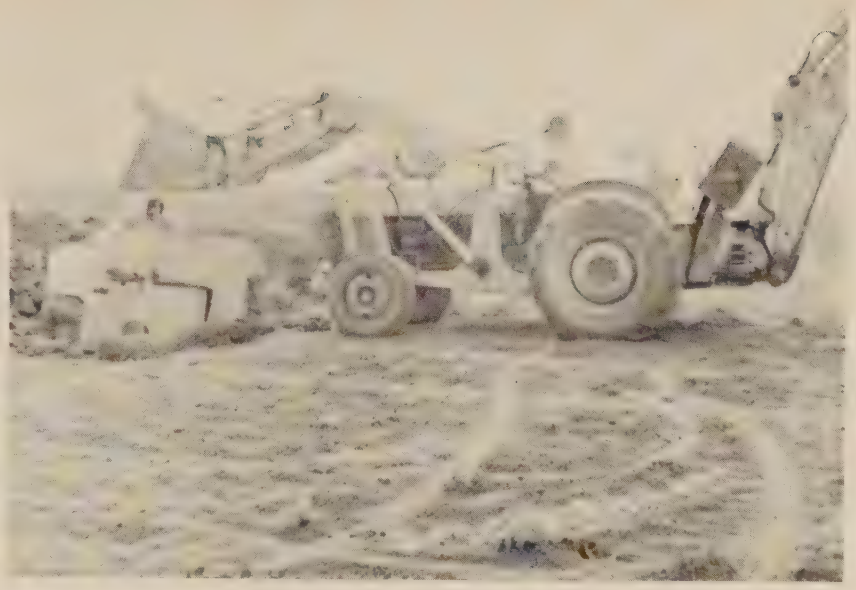
With the drainage matter settled, all it took for the structure business to start growing was time to explain it to farmers and develop their confi-

dence that the new product was worth its cost.

"Installing a precast structure now takes 6 to 8 hours, and I can sell them faster than I can make them," says Bowers. "Another advantage is that the weather is no longer the factor it once was."

From his success in the contracting business Bowers is also back into his "first career." He now owns 175 acres of rich, flat farmland near Columbus Grove in southern Putnam County and operates another 80 acres for his father.

A believer in good conservation, he practices what he preaches. In keeping with his conservation plan developed with SCS help, he has installed two precast structures, nearly 4,000 feet of surface drainage, and more than 150,000 feet of tile drainage on his own land. Convinced that good land treatment pays, the progressive farmer follows a conservation crop rotation which includes wheat with red clover for a green manure plowdown on his clay soils.



Setting one of the new precast concrete structures into place takes only a few hours.

"I learned a long time ago that I get better yields on our soils with this type of rotation than I do going with a more intense rotation," he claims.

Bowers' practice of following good land management also carries over to the rest of his acreage. He's worked with a forester from the Ohio Department of Natural Resources in maintaining his 12-acre woodlot.

"To make room for the growth of smaller trees and get a return off this land, mature trees were harvested," he explains.

Unlike many farmers in this section of the state who have cleared their woods because they feel it is worth more to them as cropland, Bowers places considerable value on his woods for wildlife habitat, esthetic value, and windbreak benefits.

With the encouragement of his wife, who assists in the time-consuming operations by managing the books, Bowers has planted a number of fruit-bearing trees and shrubs around the farmstead to add beauty to the home area and to attract songbirds and other wildlife.

An avid promoter of conservation, Bowers' sincere interest in the land brought him special recognition in 1973. He was selected Conservation Farmer of the Year by the Putnam Soil and Water Conservation District. ♦

Earlier structures installed by Bowers were built of concrete block and took 2 to 3 days to finish.



Recreation On the Rise In Watershed Projects

by Hans G. Uhlig

Recreation specialist
Northeast Technical Service Center
SCS, Upper Darby, Pennsylvania

Small watershed projects offer opportunities to relieve some of the present and projected congestion at popular outdoor spots as well as provide millions of people the advantages of a nearby recreation area.

There will be room for an estimated 18 million more recreation "customers" a year in 38 states when facilities now under construction are completed in Public Law 566 watershed projects. Earlier projects already in use can expect even heavier traffic.

The Soil Conservation Service administers the Small Watershed Program, which includes a combination of soil and water conservation measures on private and public land as well as dams and other structural measures on upstream tributaries of watershed areas under 250,000 acres.

Although the primary purpose of these small watershed projects is to prevent floods, the pools for sediment retention offer excellent recreation possibilities, particularly if enlarged to impound permanent



water for recreation purposes. Dams can be, and have been, enlarged specifically for public outdoor fun activities, as well as for fish and wildlife development.

A study of 28 of these public recreation developments already in operation underlines the booming nationwide demand for water-related recreation. These projects cover more than 9,000 acres of recreation land and more than 3,200 surface acres of recreation water.

At the time they were planned, the projects were estimated to attract ultimately 896,000 recreation visits a year. The actual number of visits in 1973 exceeded 1.3 million.

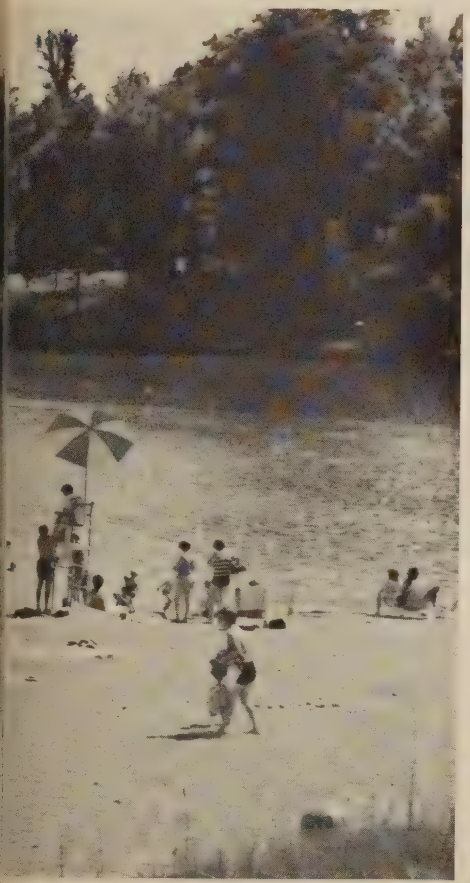
These projects received an average density of use amounting to 134 visits per acre of land—compared with an average density of 56 users per acre at all state parks in the United States.

Based on these comparisons, public recreation developments under P.L. 566 are an outstanding success.

More than 200 such watershed recreation developments are scattered throughout the country—and they are bound to relieve the pressures on other public areas.

In Ohio, for instance, Wolf Run State Park—originally estimated to receive 60,500 visits

At left, Lake Malone State Park in Kentucky draws visitors to the beach along the lake, part of the Mud River Watershed Project. At right, one of the most popular recreation activities on small watershed projects—fishing.





annually already receives more than 152,000 recreation visits a year. The 200-acre impoundment in this park near Caldwell was sponsored by the State of Ohio.

Lake Charles, a 645-acre impoundment near the town of Walnut Ridge, Arkansas, was expected to receive 200,000 visits annually; a recent study indicated more than 345,000 visits.

In Indiana, a 461-acre impoundment with 400 acres of adjacent land area dedicated to recreation in the Busseron Creek watershed was used by nearly 150,000 people in 1973—25 percent more than expected.

In South Dakota, the Pattee Creek 93-acre impoundment was expected to attract 12,000 recreation visits; it actually attracted 69,000 visits.

What attracts people to these sites? Fishing is one primary activity. Fishing visits are attracting 89 trips per acre per year, at least three times the average for a natural lake in the country. Swimming is another. The average 1-acre beach is attracting 32,000 visits a year, or 865 swimmers on a Sunday. Picnicking is another attraction. The average development was built with 60 picnic tables. In 1974, 228 picnickers sat at each table.

These impoundments and public recreation developments have contributed much to the quality in the local standard of living. Additional improvements planned to date under P.L. 566 encompass nearly 55,000 surface acres of water and approximately 100,000 cost-shared acres of land which will provide facilities for swimming, picnicking, camping, hiking, and other water-related fun. ♦

Texas 'Tryouts'

by Gary Westmoreland

Range conservationist, SCS, Temple, Texas

As a young man, George T. Halsell saw the mesquites begin to invade his father's ranch in Jack County, Texas.

He was not alarmed then, but by the time he took over active management of the ranch, mesquite was so dense that it was impossible to ride to the high point in a pasture to see the cattle. At roundup time, half a dozen cowboys often needed 2 days to get the cattle out of the brush in one pasture and into the corral.

It was then—30 years ago—that Halsell became a pioneer in fighting undesirable brush.

Then, years before the modern science of range management came into its own, Halsell began trying to control mesquite, first with arsenic and later with a basal application of kerosene and diesel, much safer but still costly and time consuming.

He was one of the first to try aerial spraying of mesquite well over 20 years ago. Although this first attempt was unsuccessful, Halsell persisted in his quest to reduce brush so he could grow more grass.

In 1959, he signed a Great Plains Conservation Program contract with the Soil Conservation Service and worked out a plan to provide for brush management on the entire ranch. The plan, approved by the Upper West Fork Soil and Water Conservation District, also provided for conservation treatment of the land and included management practices such as deferments and proper grazing use.

Halsell now had a blueprint with a schedule to follow—a conservation plan—and cost sharing to help cover the expensive job ahead of him as he embarked on a grassland improvement program.

Discovering that deferments following brush treatment improved the quality and quantity of his grasses, Halsell started a four-pasture deferred-rotation grazing system in 1969 that included 11,546 acres of his 12,748-acre ranch. This system involved grazing about three-fourths of the ranch while one-fourth was rested. A third of the herd was moved to a fresh rested pasture each 4 months. This permitted a pasture to be grazed 12 months, followed by a 4-month rest.

Halsell abandoned his four-pasture deferred-grazing system in 1972 for a more sophisticated system—the high intensity-low frequency grazing system.

When Halsell started this new system, many questions were yet unanswered. He traveled to workshops and field days to learn more about it and was assisted by SCS range

specialists. It took more than just courage to group 650 cows into one herd and begin moving them from one pasture to the next in planned sequence. Halsell has made his system work—with much hard work and study—and the innovations in his grazing system will have a lasting impact on the ranching industry.

Realizing his life-long dream of growing more and better grass, Halsell continues to control undesirable brush as well. He was one of the first to use picloram for aerial spraying of mesquite, has chained more than 3,000 acres of previously treated mesquite in the last 5 years as a means of follow-up control, and works with state universities on controlled burning as a possible means of controlling regrowth of oak brush.

Halsell has been recognized for achieving "excellence in grazing management of rangelands" by the Texas Section, Society for Range Management, through his demonstrated outstanding knowledge and ability to improve rangeland. He is a director of both the Texas and the Southwestern Cattle Raisers Associations and has been a cooperator with the Upper West Fork Soil and Water Conservation District for 30 years. More than 115 local Future Farmers of America and 4-H members gather annually at his ranch for a range management field day, and it was on his ranch that Jack County's Annual Range Management Day and Beef Cattle Field Day began. Both of these events are sponsored by the Upper West Fork Soil and Water Conservation District and attract visitors from Texas and Oklahoma. ♦



George Halsell (center) discusses grazing systems with fellow livestock men in Jack County —Charles McClure and Henry Richards.

Land Use Control: The Black Hawk County Experience

by Louise A. Lex and Louis Lex, Jr.

Visiting instructor of political science and associate professor of urban planning, Iowa State University, Ames, Iowa

How to protect the Nation's prime agricultural land is a current—and often controversial—topic. With some of the most productive soil in the world, Black Hawk County in Iowa has taken steps to direct growth away from its best farmland—using soil survey information and a zoning ordinance.

The environmentalist movement which has swept the country in recent years has emphasized the need to control pollution of the air and water. Legislative bodies have responded by enacting programs which restrict the way both resources are used. Attitudes have undergone a substantial change; no longer are clean air and pure water regarded as abundant and limitless. The irony of this concern for these resources is that there has been a reluctance to support measures which restrict the use of another key resource—land. Attitudes toward land as an expendable commodity are beginning to undergo some modifications, however, as evidenced by bills which have been introduced in Congress and laws that have been passed in a number of states.

The shift from local control of land use to state management is a result of an emerging sensitivity to the forces and effects of urbanization.

Most of the land on which urbanization has taken place is cropland; much of it is prime agricultural land. A substantial percentage of the better farmland in this country is located in counties within Standard Metropolitan Statistical Areas (central cities of 50,000 or more and the adjacent urbanizing areas). Once this land has been built upon, it cannot be recycled or purified as is the case with solid waste, air, and water. The dominant question, then, is how can growth be directed so that prime agricultural lands can be used for growing crops, and population development channeled onto other lands of less agricultural productivity?

One county in Iowa has devised a method for controlling the spread of urbanization onto prime agricultural lands within the existing state enabling legislation. Black Hawk County, located in north central Iowa, is a prosperous agricultural area with a 1970 population of nearly 133,000. In the southwest corner of the county, a blanket of loess soils reaches a thickness of 4 feet and has proved to be some of the most fertile soil in the world. Although agriculture is a major economic force in the county, there is a strong industrial base as well; the principal plant of the John Deere Corporation is located in Waterloo, a city of 75,500. Directly abutting Waterloo is a second urban area, the city of Cedar Falls, with nearly 30,000 residents. The University of Northern Iowa with a student enrollment of 10,000 is located in Cedar Falls and is another important employer in Black Hawk County.

Pressures to convert surrounding prime agricultural lands to urban uses have been substantial.

According to Robert Sieglaff, the county zoning commission chairman, the county was confronted with the problem of indiscriminate, leapfrog residential development without regard to the suitability of the land for agricultural or building purposes.

"We have areas that can



absorb residential building. There is no sense to building on good farmland," Sieglaff contends, "when there is other land which is just as suitable for residential purposes."

Two factors coalesced to help to protect vital farmland and direct residential growth to suitable, but less valuable, farmland.

The Black Hawk Soil and Water Conservation District had been conducting a 4-year comprehensive soil survey. The survey was completed, for the most part, in July 1973.

At the same time, the Iowa Northland Regional Council of Governments (INRCOG), one of the 16 multicounty planning commissions in Iowa, had agreed to update the county's zoning ordinance under a contract with the county board of supervisors. The zoning ordinance revision began in 1971 and was completed in 1973.

Kenneth Lind, assistant director of INRCOG, was charged with the chief responsibility for revision and he recognized the potential value of the soil survey to the revised ordinance. With the detailed study the conservation district was conducting, a crop suitability rating (C.S.R.) could be assigned to all land in the county. The C.S.R. was a way of rating the capacity of the soil to produce crops. Lind saw that zoning could be based on the C.S.R. and written into the ordinance. With the soil survey data, prime agricultural land could be identified and protected through the mechanism of zoning.

The Iowa Code exempts farms from zoning as long as they are used for agricultural purposes. The code does not define what a farm is, however. The old county zoning ordinance, which was being revised, had defined a farm as 80 acres, and it permitted 3-acre residential lots anywhere within the A-1 (agricultural) zone. Under the revised ordinance, the minimum acre lot for farms with single-family homes was 35 acres. An additional change was permitting 3-acre single-family residential lots on land in which the C.S.R. rating was below 85 percent. The net effect of these provisions was to prohibit residential development on prime agricultural land as defined by the county soil survey and to encourage 3-acre residential development on less productive farmland.

On July 10, 1973, a public hearing was held on the proposed ordinance. At the hearing a number of farmers and a realtor voiced objections to the proposal. Several expressed the view that the new proposal would discourage growth in Black Hawk County and shift it to the adjacent counties.

One farmer voiced concern about a "system of regulation which will take away my individual rights as a farmland owner to choose the disposition of my farm. More important" he continued, "I would not like to have the price of my land stay at a limited level because several persons sitting in judgment say that my land can-

not be used for any other purpose than farmland." A representative from a realty firm in Waterloo opposed the 35-acre minimum as too restrictive.

Of the 11 people who expressed their views, one spoke in support of the proposal. "I think it's necessary that we save our best farmland, absolutely necessary," he said. "We have the new soil survey in Black Hawk County and this pinpoints where the good farmland is. Certainly some farmers farm a farm better than others and they can get more out of poor farms, but we certainly know from soil surveys what the best soil in the county is. We ought to support it."

According to Sieglaff, no group actively supported the proposal, and only one group opposed the revision — the county realtors' association.

"Their bread and butter is the sale of land, and they want to sell land with as few restrictions as possible," Sieglaff said.

The resulting ordinance proved to be a compromise with the realtors' group. The regional planners wanted to enlarge the amount of land that would have been defined as prime agricultural land; the realtors wanted to reduce it. The 85 percent C.S.R. rating finally agreed upon represented about 15 percent of the total farmland in Black Hawk County. INRCOG Executive Director Hugh Copeland said the rating should be reduced to 75 percent to enlarge the definition of prime agricultural land.

Although no farm organization endorsed the proposal, farmers generally agreed that the new zoning was necessary. Two people in particular contributed to this consensus. One was Bart McAninch, the SCS district conservationist in the Black Hawk Soil and Water Conservation District, under whose supervision the soil survey was being conducted. Cooperating with INRCOG planners, McAninch helped to set the stage so there was an understanding by the farmers of the need. An Iowa native, McAninch strongly identifies with the farmers and the locality.

"We don't want someone from Washington or Des Moines telling us what to do if we can do it ourselves," he said.

The second person who greatly influenced the farmers was the chairman of the county zoning commission. Sieglaff is a second-generation farmer in Black Hawk County. He has served on the county zoning commission since 1960 and has been its chairman since 1965. He has been active in 4-H Club work and has served as chairman of the Black Hawk County Farm Bureau. He feels that other farmers not only share his views but are even more vigorous about land protection than he is. He explains his position this way: "What I was doing was expressing their thoughts. There are many who are more adamant than I am. We are the stewards of the land, and we have an obligation to protect it.

"I've seen this area grow and what has occurred. We are trying to preserve our environment so succeeding generations will have something to work with."

On September 11, 1973, the zoning ordinance was adopted unanimously by the county board of supervisors. The anticipated movement of population to other adjacent counties began. In June 1974, however, the Buchanan County Board of Supervisors followed the lead of Black Hawk County and adopted a similar ordinance. At the present time INRCOG is working on a zoning ordinance for another adjacent county, Bremer County, and the ordinance will be patterned after the Black Hawk County ordinance. The city of Waterloo, according to the regional planners, also is studying the possibility of protecting the prime agricultural land within the city limits. ♦

Re-Creating Early Texas Landscapes

by Jacob C. Garrison*
and Lynn Pace

Plant materials specialist, SCS, Phoenix, Arizona, and biologist, Texas Parks and Wildlife Department

Looking out across rangeland or other land in Texas, it's difficult to appreciate how greatly the landscape has changed. Even if there are no farmhouses or highways in view, the very plants in front of the viewer are, in all probability, quite different from those that existed a century ago.

Before the settlers came, clearing the land and forests and grazing their livestock, nature had over the centuries produced a unique mixture or community of native plants and animals particularly adapted to the region where they occur. Plant and animal communities might differ within a very short distance, and would be quite different in various regions of Texas, but within their province such communities were time-tested and nature-proven.

However, subsequent livestock grazing pressures, land clearing, soil erosion, timbering, fire control, urbanization and a host of other man-influenced factors drastically changed this relatively stable condition. Natural communities fluctuated and often were greatly modified. Those plants desirable for livestock forage, timber or other uses gradually were removed through constant and prolonged utilization. In time, utilized species were replaced by more adaptable but often less desirable species.

The people of Texas have long recognized the value of maintaining natural areas throughout the state, and an extensive system of state parks reflects their concern. Now the Texas Parks and Wildlife Department (TP&W) and the Soil Conservation Service have joined in a cooperative effort to maintain and in some instances re-create on these parklands, the natural communities of early Texas.

Through a 1973 agreement between the two agencies, a full-time biologist from the TP&W Resource Management Section is stationed at SCS's James E. "Bud" Smith Plant Materials Center at Knox City in north central Texas. The biologist trains in horticultural techniques, assists in the center's operational procedures, and provides direct assistance to area parks in the application of plant materials.

Established in 1964, the "Bud" Smith Plant Materials Center is maintained and operated for assembling, testing, selecting, and providing for the commer-

*Author was formerly the manager, James E. "Bud" Smith Plant Materials Center, SCS, Knox City, Texas.

cial production of plants for conservation purposes. Working through local soil and water conservation districts, SCS collects, evaluates, and distributes for field testing plant materials throughout Texas and western Oklahoma from the "Bud" Smith Center.

Over 1,400 accessions, or plant collections, are being evaluated on the center's 70 acres of irrigated cropland. Approximately 290 different species, including 120 grasses, 100 forbs and legumes, and 68 woody plants, are being grown for evaluation or production. In 1973, 8,000 pounds of seed, 8,538 plants, and 30,760 rhizomes were grown for field evaluation by district cooperators.

Following completion of the 1973 crop harvest, 752 pounds of seed, representing a variety of native plant species, were allocated by the center to TP&W for use in various state parks. During the same period, 7,000 rhizomes and 865 native plants were also made available. Native grass, hay, and seed cleanings were used as mulching materials on critical areas within the parks. Small amounts of native seeds and plants suitable for landscaping, beautification, and special interest areas are provided to TP&W whenever the center's supply allows.

In 1974, the second year of the program, more than 1,000 pounds of seed, 222 plants, 2,888 rhizomes, and about 350 bags of mulch and bales of hay were distributed to state parks from the plant materials center. These plants included such native species as little bluestem, sideoats grama, blue grama, switchgrass, indiangrass, and Maximilian sunflower.

In a related program, the center and the park department are also working to reestablish communities of threatened and endangered plant species. Many of these are threatened by extinction chiefly because of man's activities, and the state park system offers an excellent haven for such species.

Parklands create an excellent opportunity to re-create or synthesize the natural climax conditions that once prevailed over the landscape. Using relict sites and historical accounts and incorporating current technical information on plant production and species distribution, the resource manager can reestablish many of the native plant communities.

At this time, a program such as this is unique to Texas, but it is an example of the benefits of interagency cooperation. Through the efforts of both the Soil Conservation Service and the Texas Parks and Wildlife Department, visitors to Texas state parks may soon be given a view of the land as it was, in the days of early Texas. ♦



After 3 years of evaluation, the better plants in this assembly of native grasses at the center may be increased and the seed used in range seeding mixtures.

An assembly of native woody plants at the center includes small-flower peachbush, wildplum, little-leaf lead-tree, plum, skunkbush, and four-wing saltbush. All have potential for plantings in Texas parks.



The air-transport grass seed stripper harvests seed from sideoats grama at the center. Cleaned seed will be used later in range seedings by the Texas Parks & Wildlife Department and other cooperating agencies.



Recon...

Saltgrass meadows renovated into pasture? USDA's Agricultural Research Service reports research underway that may replace saltgrass meadows in the West with valuable native forage species. These meadows receive ample moisture from natural seepage in many parts of the West where water supplies are short, but are most apt to support saltgrass—which is of little value for livestock production and difficult to control. Research indicates that an application of 4 pounds per acre of glyphosate, a chemical herbicide, should effectively rid meadows of saltgrass. A study of soils in these meadows indicates that most are capable of supporting such valuable native forage species as alkali sacaton. Additional studies are underway for other potentially higher yielding species, including tall wheatgrass, Russian wildrye, and smooth brome. All show tolerance to harsh growing conditions and are easier to establish than alkali sacaton.

'Around the world.' If all the trees planted in North Dakota in the last 35 years were in a single row, they would reach around the world nearly 3½ times, reports SCS's state forester in North Dakota, Elmer R. Umland. Plantings during those years have added nearly 175 million trees and shrubs to more than 240,000 acres, and the tree planting program continues to expand almost every year, Umland said. Leaders in the work have been North Dakota soil conservation districts. Most of the plantings have been cost shared through the programs of the Agricultural Stabilization and Conservation Service or the Great Plains Conservation Program administered by SCS. Used in field and farmstead windbreaks, wildlife plantings, and protective belts for public areas, the plantings have helped control wind erosion, keep drifting snow off roads and farmyards, attract wildlife, and reduce fuel and feed needs by protecting homes and livestock.

Less water. Plants are naturally wasteful of the water they extract from the soil—a fact that attracts special attention in the Great Plains. At the Oklahoma State Experiment Station, researchers are experimenting with practices and varieties to help farmers fight drought. In one experiment, they put an asphaltic coating on soil between rows, but found that over the season too many little cracks appeared and evaporation was not stopped as much as expected. Other experiments there so far indicate that plants grown in rows 30 inches or less apart use less water than those in wider rows, and plants in north-south rows use less water than in east-west rows.

Soil surveys

Arkansas

Sebastian County. By John B. Cox, Billy A. Garner, and Frank M. Vodrazka. 1975. Soil Conservation Service and Forest Service in cooperation with Arkansas Agricultural Experiment Station. 66 pp., illus.; maps.

Iowa

Howard County. By Russell L. Buckner and John D. Highland. 1974. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station, Cooperative Extension Service, Iowa State University, and the Department of Soil Conservation, State of Iowa. 131 pp., illus.; maps.

Webster County. By Maynard P. Koppen. 1975. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station, Cooperative Extension Service, Iowa State University, and the Department of Soil Conservation, State of Iowa. 121 pp., illus.; maps.

Kansas

Rice County. By Marcellus L. Horsch. 1974. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 63 pp., illus.; maps.

Meetings

Nebraska

Buffalo County. By Louie L. Buller, Robert S. Pollock, Rafael A. Boccheciamp, Charles L. Hammond, Hal Hill, and John A. Elder. 1974. Soil Conservation Service in cooperation with University of Nebraska, Conservation and Survey Division. 86 pp., illus.; maps.

Richardson County. By Howard E. Sautter and Arthur D. Kuhl. 1974. Soil Conservation Service in cooperation with University of Nebraska, Conservation and Survey Division. 72 pp., illus.; maps.

Oregon

Trout Creek-Shaniko Area. By George L. Green. 1975. Soil Conservation Service and Forest Service in cooperation with Oregon Agricultural Experiment Station. 83 pp., illus.; maps.

South Carolina

Laurens and Union Counties. By Wallace J. Camp, J. C. Meetze, W. H. Fleming, and L. E. Andrew. 1975. Soil Conservation Service and Forest Service in cooperation with South Carolina Agricultural Experiment Station and the South Carolina Land Resources Conservation Commission. 65 pp., illus.; maps.

June

1–4	*Twenty-second National Watershed Congress, Portland, Oreg.*
8–12	*General Federation of Women's Clubs, Washington, D.C.*
8–13	*American Water Works Association, Minneapolis, Minn.*
15–19	*Air Pollution Control Association, Boston, Mass.*
16–20	*American Geophysical Union, Washington, D.C.*
18–20	*Twelfth National Agricultural Plastics Conference, Vineland, N.J.*
22–25	*Sixty-eighth Annual Meeting of American Society of Agricultural Engineers, Davis, Calif.*
22–25	*National Association of Counties, Honolulu, Hawaii*
23–25	*American Plywood Association, Vancouver, Canada*
24–28	*Association of Consulting Foresters, Greenville, Me.*
26–27	*Southern Forest Institute, Inc., Asheville, N.C.*
29–July 3	*American Seed Trade Association Convention, Houston, Tex.*
30–July 3	*National Environmental Health Association, Minneapolis, Minn.*

July

3–8	*National Education Association, Los Angeles, Calif.*
13–17	*Seventy-fifth Annual Meeting of American Society of Landscape Architects, San Antonio, Tex.*
19–23	*American Association of Nurserymen, Inc., Chicago, Ill.*
20–24	*National Federation of Business and Professional Women's Clubs, Inc., of the USA, Las Vegas, Nev.*

August

3–6	*National Farm and Power Equipment Dealers Association, Honolulu, Hawaii*
4–8	*American Society of Civil Engineers, Annual Hydraulic Specialty Conference, Seattle, Wash.*
10–13	*American Agricultural Economics Association, Columbus, Ohio*
10–13	*Soil Conservation Society of America, San Antonio, Tex.*
11–13	*American Society of Civil Engineers Watershed Management Symposium, Logan, Utah*
13–15	*American Society of Civil Engineers Irrigation and Drainage Specialty Conference, Logan, Utah*
13–15	*Twenty-Sixth Annual Highway Geology Symposium, Coeur d'Alene, Idaho*
17–22	*American Institute of Biological Science, Corvallis, Oreg.*
17–22	*Ecological Society of America, Corvallis, Oreg.*
24–29	*American Chemical Society, Chicago, Ill.*
24–29	*Joint Annual Meeting of American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America, Knoxville, Tenn.*

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

U.S.MAIL

CONTROLLED CIRCULATION POSTAGE
PAID IN WASHINGTON, D.C.
AGR 101

MOVING? Send present mailing label and new address, including zip code, to SOIL CONSERVATION, SCS, U.S. Department of Agriculture, Room 6205, Washington, D.C. 20250.

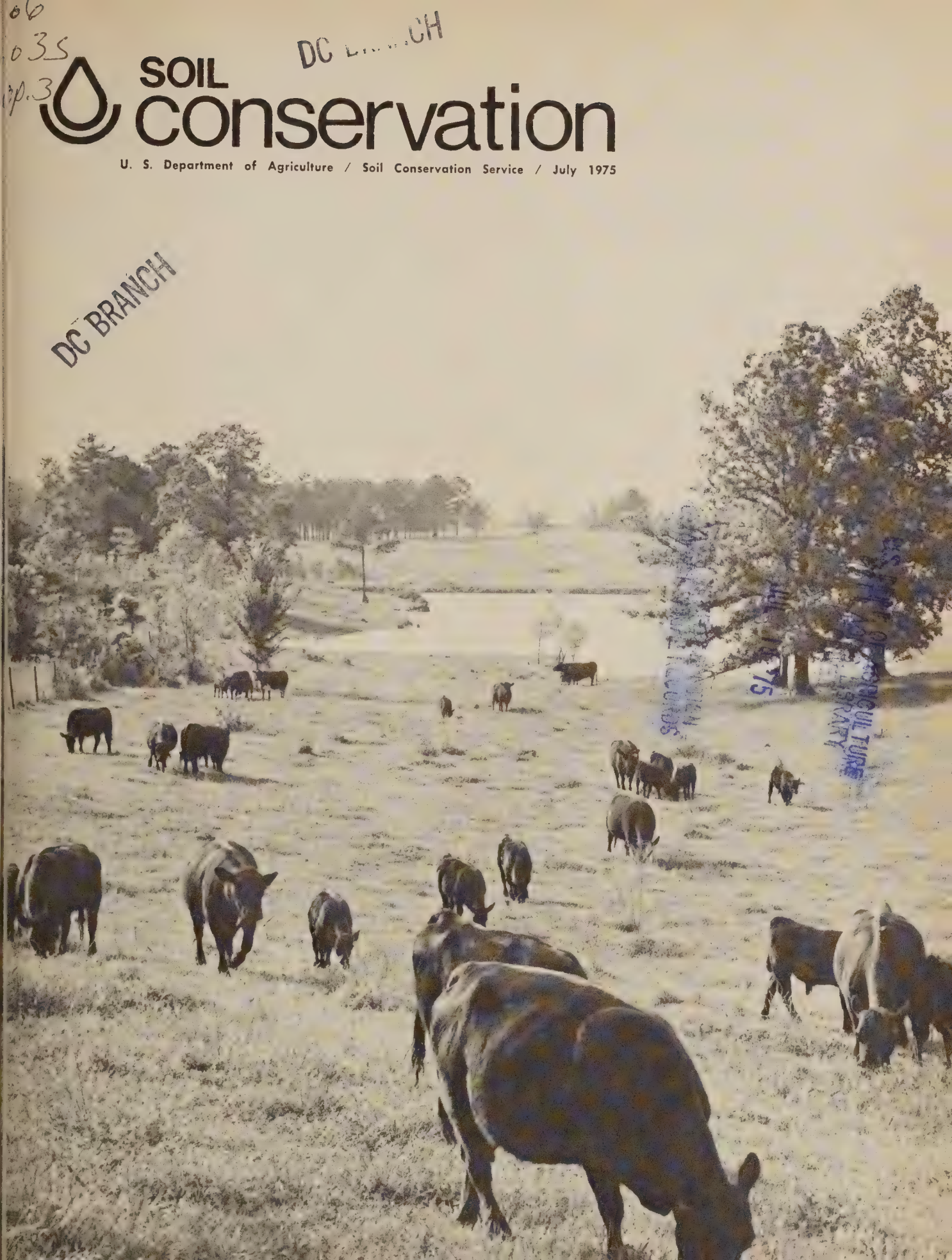
aG
.035
sp.3

DC BRANCH

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / July 1975

DC BRANCH



U.S. DEPARTMENT OF AGRICULTURE
JUL 16 '75
NATIONAL AGRICULTURAL LIBRARY

Grazing Lands: The Pressure Is On

We have an urgent need to accelerate SCS technical assistance to cooperators on grazing lands.

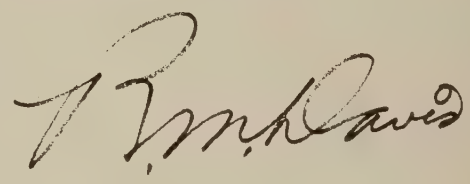
Not only is there pressure on these lands to increase livestock production, but also for recreation, for wildlife habitat, and for some conversion to cropland.

Yet, if we could apply what we know to all these lands today, we could substantially increase total forage production and still use part of the acreage for other purposes.

We not only know how to increase forage production, but we also know how to improve wildlife habitat and protect our land and water resources. In Nebraska, planned grazing systems are not only increasing forage production on rangelands—and thus the stocking rate—and improving range condition, but ranchers also are praising these grazing systems for blowout control in the Sandhills. In Texas, a side benefit of short duration range grazing systems has been a tremendous improvement in upland wildlife habitat. White-tailed deer have increased fourfold in many areas, adding income to ranchers through recreation and hunting. These systems have grown phenomenally in the Southwest. In Texas, in 6 years, they have become the most popular form of planned grazing system, with 400 short duration systems on 2 million acres. In Utah, rest rotation grazing systems have been successful with both sheep and cattle, with increases of up to 30 percent in feed produced. In Iowa, forage shortages during the hot summer months may be alleviated by the use of warm season native grasses.

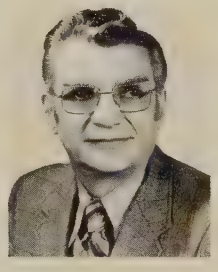
There's a lot going on around the country in terms of increased forage production—both in terms of improved pastures and planned grazing systems. We don't have all the answers. Admittedly, good grazing systems have yet to be developed for some parts of the country. But in most places, we can help farmers and ranchers improve their forage production now while protecting the land.

The pressure is on our grazing lands. We need to help farmers and ranchers develop a plan specifically for their operating units to fit their goals and capabilities for production and for conservation and to meet their individual feed and forage opportunities.



R. M. (Mel) Davis is the fifth administrator of the Soil Conservation Service, succeeding Kenneth E. Grant, who retired May 30.

Formerly assistant administrator of SCS, Davis has been with the Service since 1952. He held several field positions in North Dakota before becoming assistant state conservationist in Pennsylvania in 1963 and has served as state conservationist in Pennsylvania and in the dual position of administrator's field representative for the northeastern states and director of the SCS Technical Service Center at Upper Darby, Pennsylvania.



R. M. DAVIS

A native of Ambrose, North Dakota, Davis, 48, graduated from North Dakota State University with a B.S. degree in agricultural education.

His appointment, effective June 1, was announced by Secretary of Agriculture Earl L. Butz.

Grant, 55, began his career with SCS in 1946 as a soil scientist in his native New Hampshire. He served as state conservationist in New Hampshire and was state conservationist in Indiana. He was named administrator of SCS in 1969. A graduate of the University of New Hampshire, Grant has received USDA's highest honor, the Distinguished Service Award.

SOIL conservation

July 1975, Vol. 40, No. 12

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in transaction of public business required by law of this Department. Use of funds for printing **Soil Conservation** has been approved by the Director of the Office of Management and Budget through July 31, 1978.

Earl L. Butz
Secretary of Agriculture

R. M. Davis, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Reprint permission

Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names

Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

Contents

2 From the Administrator

4 A Growing Tree Program in Sanilac
Erwin Carter

6 A Western Watershed: 100 Years Later
Gerald Jorgenson

10 Planting for Pheasants
S. Duane Town

12 Forty Years With SCS

17 Improving Rangeland in South Dakota
Wayne L. Noble

18 Tackling the Shuffling, Shouting Sands
Noel Marsh

22 Recon . . .

22 Soil Surveys

23 Meetings

COVER: Conservation practices helped reclaim this former abandoned and eroded cotton farm in the Tallahatchie County (Miss.) Soil Conservation District. Beginning on page 12, four 40-year veterans of the Soil Conservation Service talk about conservation work over the years.

A Growing Tree Program In Sanilac

by Erwin Carter
Chairman, Forestry Committee,
Sanilac Soil Conservation District, Carsonville, Michigan

There are few things in life more thoroughly profitable than trees. Soil profits from the protection that trees provide. Birds and other wildlife profit from the food and shelter that trees supply. The air profits from the action of the trees, which replenishes oxygen, cools the air, and cleans it during photosynthesis. Man profits from trees whenever he eats fruit, saws wood, rests under the shade of a tree, pours maple sirup on his griddlecakes, reads articles such as this printed on paper, or breathes.

There are few things more profitable to a landowner than trees. They cost very little to plant, and provide fruit and nuts, shade and beauty.

And, there are few things more profitable to a soil conservation district than trees. If this last statement needs any proof, we can provide it up in Michigan. Our district, the Sanilac Soil Conservation District, has a very successful tree-planting program.

The 615,000-acre county is large by Michigan standards, and rich in loamy lake bed soils. Ours is a big dairy county with three times as many cows as people. Much of our good land is used to produce sugarbeets, navy beans, or feed for the dairy cattle.

It might be asked, why plant trees on such good farmland?

Not all of Sanilac's 615,000 acres are flat, fertile land. Some soils are less desirable for farming because of slope, coarse texture, or susceptibility to erosion.

We firmly believe that each acre of soil in Sanilac is best suited to a particular purpose, and we aim to see that each acre is put to its best use. This is good land use—the aim of every good soil conservation district today.

Our tree planting program was the result of a variety of events.

First, we recognized that every acre was not suited to corn, beans, or even hay. This came as a result of our district being completely soils mapped, with soil interpretations for each soil type. Some soils clearly should have been in woodland.

The district got help in stimulating tree planting. Soil Conservation Service personnel recognized the need and encouraged landowners to consider trees where desirable. The Agricultural Stabilization and Conservation Service through its newsletters and cost-sharing program spread the word around the district. Our local newspapers gave good coverage to stories written with a tree planting theme.

Next, we needed a way to get trees in the ground without too much hand labor from which people are inclined to shy away. After looking at a tree planter I went home and built my own. It was a three point hitch type and it did the job. Later, when the program expanded, I built a second, similar planter with some improvements and four other planters for neighboring districts.

As evidence of how the program has grown, we planted a total of 70,000 trees in 1965; by 1972, that figure was half a million. Interestingly, approximately 75 percent of these went on lands of absentee owners—people wanting to spread out if only for the weekend, and yet wanting to do the best for their land. We have found that when nonagricultural persons purchase land, the first thing they look for is water but the second thing they want is trees.

A program of this size is difficult to administer, but ordering trees from nurseries 6 to 12 months in advance helps to assure an adequate supply of stock. Arrangements are made to have them arrive in Sandusky



The author at work—putting in trees with the tree planter he built.

about the 20th of April.

Two days are spent by the directors and their wives in packing the trees for easy pick-up by the landowners on a Friday and Saturday. Landowners, who pay for the trees and the planting, can get their seedlings packed in peat moss at the pickup station, the Sandusky fair grounds. The district provides a variety of hardwoods and evergreens for nearly all local soil types and tries to show a profit for handling the seedlings by charging approximately the cost for large orders and more for small orders.

We've made mistakes but each year we try to streamline the program and correct errors. We've talked trees when we should have talked seedlings—one landowner, who had ordered only 200 seedlings which he could have carried with one arm, came with a trailer. One time we planted trees on the wrong farm. No one is perfect.

On the other hand, many benefits have been derived from the building of a successful tree program.

First, of course, we have planted many trees on soils which are best suited to trees.

Second, the revenue the district has realized has enabled us to carry on other conservation programs, and the various programs enhance each other. This includes a sixth graders' tour each year with all schools invited. Every Arbor Day each third grader in the county is given a white pine seedling, our state tree, to plant at his home. A tree identification contest has helped stir interest in the high school classes. A scrapbook contest has included the younger boys and girls and started them talking conservation at home.

Profits from the program have made it possible for us to send teachers to conservation school, a state program designed to instruct people in soil and water conservation. Our directors now have a district aide whose salary is paid in part by funds from the tree planting program. Attendance at state and national conventions has been partly financed by the monies.

And each of us, as we grow older, enjoys driving through the district and seeing conservation on the land—trees healthy and growing for the next generation. ♦

A Western Watershed:

100 Years Later

by Gerald Jorgenson*
District conservationist, SCS, Provo, Utah

Most people think the West was won with wagon trains and iron horses, Colts and Winchesters, gold pans and cattle drives. In truth, perhaps more than anything else, the American West was won with dams and ditches, for in the West, water is king.

The settlers in Ferron, Utah, knew this, and for the last 100 years they and their descendants have been working to manage this precious, and dangerous, resource. In recent years, they have done this through a major P.L. 566 watershed project.

The first settlers moved into Ferron in December of 1877, and by Christmas Eve they had surveyed the first irrigation ditch south of the present town. The winter was passed in building the structure, and Molen Ditch supplied water to the settlers' gardens in the spring of '78. That same year a second ditch, Petersen Ditch, was also constructed.

More than a decade later, a reservoir was built in the mountains above the town; and in 1905 the Ferron Canal and Reservoir Company was organized in an attempt to solve water problems.

Since the 1870's, overgrazing had caused a depletion of the natural vegetation. As snow melted in the spring, heavy runoff caused flooding of the lower areas. Heavy thunderstorms in the late summer caused torrents of silt and debris-laden water to run onto the cropland and through Ferron; more than one life has been lost in the floodwaters.

On the other hand, as much as half of the annual water yield of Ferron Creek comes within 15 to 30 days during May and June. Stream flow in March and early April is insufficient for preplowing and preplanting irrigation, and water supplies drop drastically once again in July and August.

In the early 1960's, area residents united behind the Ferron Canal and Reservoir Company, Ferron Town, San Rafael Soil Conservation District, and Emery County to seek approval for a water project under P.L. 566. In August 1962, the Soil Conservation Service approved planning assistance for the project, and in May of 1965, Congress approved the $7 million Ferron project.

The U.S. Forest Service and the Department of the Interior's Bureau of Land Management began treatment of some 29,000 acres of federal lands to improve the watershed. Treatment included contour trenching, contour furrows, pinion-juniper and sagebrush control, erosion control, fencing, reseeding, and livestock and wildlife water developments.

(continued on p. 8)

* Formerly district conservationist, Castle Dale, Utah.



An aerial view shows the Mill Site Reservoir and cropland irrigated from it near Ferron, Utah.



Ferron Creek flows from the dam outlet.

The first construction completed under the new watershed project was the relocation of 2,000 linear feet of the Molen Ditch. In addition, a 1,200-foot cut was made through shale on the North Ditch. In August 1967, construction began on five debris basins. Next came relocation of approximately 3 miles of county road so that a dam and reservoir could be built at an area known as the Mill Site.

In June 1969 at groundbreaking ceremonies for the Mill Site Dam, a thunderous dynamite charge moved the first earth. Two years later, dedication ceremonies took place as water began filling the 19,000 acre-feet reservoir.

That first year, the reservoir held back 10,000 acre-feet of water to be used in late July and August.

"This made possible a third cutting of alfalfa hay and an additional irrigation of pastures," said Ellis Wild, president of the Ferron Canal and Reservoir Company. "Even with a below average water year, most irrigators had all the water they needed."

In the fall of 1971, construction started on two more debris basins and the main divider structure at the heads of the three main canals—the North Ditch, South Ditch, and the Molen Ditch. In addition, a 900-foot-long, 42-inch diameter concrete-pipe siphon was installed in the South Ditch.

During the spring and summer of 1974, the last debris basin and the Duck Fork Fishery were built. Storage rights in the Duck Fork and Willow Lake Reservoirs were sold to the Utah Division of Wildlife Resources for the development of fishing and recreation opportunities. Fish have been stocked in the Mill Site Reservoir. A boat ramp has been constructed, and plans have been drawn by the Utah Division of Parks and Recreation for the development of camping facilities.

In the early years of the Ferron Watershed project, a group of nine farmers owning land east of Ferron installed approximately 11 miles of plastic pipe and watering troughs for their livestock. This project and four or five others received assistance through the ACP and REAP programs. Several similar systems were installed by other groups.

The largest and most complex pipeline consisted of a 2-mile long, 4-inch main line to the town of Clawson and then a system of approximately 11 miles of smaller pipe to the farms north, east, and west of Clawson. One state and four federal agencies assisted in cost sharing and in planning this project along with the local people. Until this pipeline system was completed, Clawson received its domestic water from the irrigation canal.

Much has happened in the

9 years since the first earth was turned for this watershed project. Clear water now runs in canals where muddy water previously flowed. Silt deposits in canals and on farm lands diminished.

The economy of the area has improved and is now more stable. Paul Crawford, chairman of the San Rafael Soil Conservation District, said: "I can now count on a third cutting of alfalfa. My corn and grain production has also increased, and with an assured water supply, we can now apply more fertilizer."

Sam Singleton attributes his increase of 8,000 bales of hay to the additional water supply and the additional fertilizer he could apply because of it. Land values have increased.

Each year a few more people move back to the hometown as jobs and business opportunities open up to them. Many are happy to leave the hustle and bustle of city life to again enjoy the peaceful, pleasant atmosphere of country living.

This resettlement is symbolic —it reflects the fulfillment of a century of effort by the people of Ferron. ♦

Farther downstream, the main divider structure is at the heads of the three main canals—North Ditch, South Ditch, and Molen Ditch.



Planting for Pheasants

S. Duane Town
District conservationist, SCS, Vale, Oregon

Leo Rickard, a semi-retired Vale, Oregon, lumberman, now has what he wanted when he bought 160 acres north of town in 1971—excellent food and cover for a bountiful crop of game birds.

And Rickard's tenant, Tony Mendive, who goes along with Rickard's wildlife plantings, has some 80 acres of land that can be better irrigated and drained then they ever were before.

Four years ago, Rickard asked the Malheur County Soil and Water Conservation District to help him develop a farm conservation plan emphasizing erosion control, improved crop production, and bird hunting.

Weeks later Bob Corthell, the Soil Conservation Service state office biologist in Portland, Oregon, and I walked the fields with Rickard to see where to begin.

After a half day's look, we began to consider the alternatives that presented themselves for the development of the conservation plan to improve the cropland and develop wildlife habitat.

Willow Creek, which angles through the farm, offered excellent food and cover potential for game birds.

Rickard's plan recorded his decision to redo the irrigation system for the 80 cropped acres, control erosion along the creek's banks, and provide food and cover for birds.

The south 40 had a real alkali problem. Rickard staked the field and SCS surveyed and figured the grade so it would irrigate east. The conservation contractor leveled the field. Now it can be well irrigated and its alkalinity reduced. The north 40 also was leveled, but to irrigate to the south. About 2,200 feet of concrete-lined irrigation ditch were put in on the west side of the 40's and 1,074 feet across the north end.

The Portland wildlife biolo-

In carrying out his conservation plan, Leo Rickard had the steep west bank of Willow Creek sloped 3:1 and seeded. Willow cuttings will be set out along the edge of the stream.



gist suggested a trial be made of sloping the west bank of Willow Creek and seeding it. The vertical bank stood about 10 feet high. Rickard consulted the Oregon Wildlife Commission and filed an application for a permit with Oregon's Department of Environmental Quality before he was given the green light. Using a dragline the contractor gave the banks a 3:1 slope. Rickard then seeded the slope to Topar pubescent wheatgrass, Nomad alfalfa, and midget milo. He used a portable sprinkler to establish the bank seedlings. Topar's extensive root system holds the soil in place on the bank. Increased channel capacity also helps during high water flows.

This seeded bank has furnished excellent food and cover for pheasants. Livestock are kept off the streambank.

Several odd space, wildlife plantings were made, including 2 acres of midget milo. Corn was also planted as part of the farm's operation. Some strips were left unharvested for food and cover; the rest were cut for ensilage.

When opening day for pheasants arrived last year in Oregon, Rickard and a friend headed across the road with Rickard's two Brittany spaniels, Duffy and Sandy. Their plans were to first hunt the 2-acre patch of midget milo. The two hunters positioned themselves as the spaniels went to work, and the milo patch literally exploded with pheasants. The hunters were so amazed, they had problems deciding which cock to zero in on. Final score for the milo patch that morning was only two birds.

In May 1974 Rickard bought the adjoining 160 acres. He revised his original conservation plan and he'll improve the additional cropland by leveling, revising the irrigation system and drainage, and he'll make additional wildlife plantings. Additional streambank improvement is part of the plan as there is a serious problem of streambank erosion and loss of good cropland. Willow plantings will be put in along the edge of the stream to stabilize the bank and provide game cover.

"With a harvest of close to 75 cock pheasants during the 1974 season, I'm beginning to believe that Corthell knows what he's talking about when he says good feed and cover will attract them," Rickard commented. ♦

Rickard shows a head from the midget milo patch he's planted for pheasants. Last year, hunters harvested nearly 75 cock pheasants on his farm near Vale, Oregon.



Forty Years With SCS



WILSON T. MOON

Forty years ago the Soil Conservation Service was created by Congress in response to one of the worst environmental crises of our history. Today SCS still counts in its ranks many conservationists who began their work with the Service in 1935. As ***Soil Conservation*** *winds up its 40th year, we asked four of these veterans to give us their views on the environment, the Service, and the conservation movement.*

Wilson T. Moon *began his SCS career in Texas, and after serving also in Arkansas, New Mexico, and Indiana, is now state conservationist for Iowa.**

Neal Munch *started in SCS as an assistant agronomist in New Brunswick, New Jersey. He has worked in New Jersey throughout his career and is presently SCS's district conservationist in Freehold.*

Charles W. Naylor *has worked mostly in Kansas and Oklahoma during his 40-year career, starting as a junior technical foreman in Mankato, Kansas. He is now district conservationist at Concordia, Kansas, on the eastern edge of the Great Plains.*

Walter C. Nelms *began his SCS career as a technical foreman in Ashland, Mississippi, and has worked in various SCS offices in Mississippi. He is now SCS's assistant state conservationist for Mississippi.*

How has the American environment changed in the last 40 years?

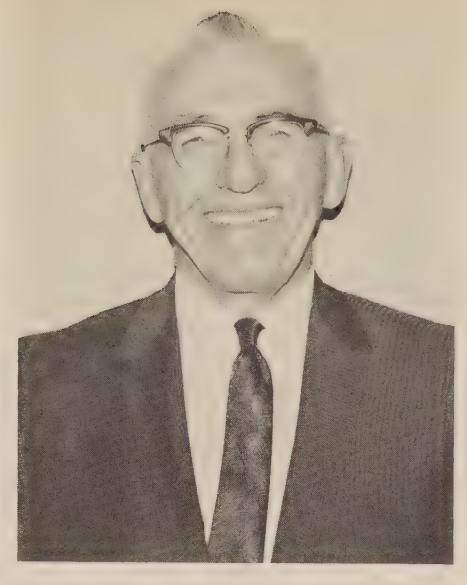
Naylor: There's been a change in farming methods. Back in the 1930's, many farmers in western Kansas were burning the stubble. Then we hit 3 dry years and the soil began to move. Today farmers do not permit this to happen; they protect the soil by keeping residue on or near the surface. The conditions that cause soil losses, particularly blowing, will continue because some people get careless. But the problem has been reduced until it is no longer a national problem.

Moon: We've come a long way in conservation. This doesn't minimize the problems that we still have, but today we know a great deal more, and the problems aren't as great as they were in the West in those days. We've plowed up more land, but we've made progress in techniques that will prevent it from eroding. We've turned a lot of land back into grass and hay and established thousands of acres of strips of vegetation through the Great Plains

* Moon retired June 30.



WALTER C. NELMS



CHARLES W. NAYLOR



NEAL MUNCH

Conservation Program and our conservation practices.

Nelms: Forty years ago, erosion was a tremendous problem in Mississippi. Thousands of acres of land were virtually destroyed by gullies. Those gullies were spouting millions of tons of sediment, which were clogging up streams and choking drainage systems. Sediment covered roads and railroads. We have pictures of tenant houses in the Delta that were covered right up to the eaves. It's hard to imagine now when you go through that hill country that we once had that problem; most of that land is now covered by pine trees and pastures that hide the gullies and protect the soil.

Munch: Here we had mostly farmland. All of a sudden, after the war, homes began sprouting all over. I don't think we're improving the environment here—we're slowing up its deterioration. In this county, we're losing about 3,000 acres of farmland a year. There's more pollution, and now the air in Freehold is unsatisfactory several days a year. The natural beauty and vegetation that we had here is leaving us as population pressures mount. But things would be much worse if it weren't for our work.

What were SCS operations like in the 1930's?

Nelms: Of course, our operations were fairly primitive. We built terraces with slipscoops, each of which held about a barrelful of dirt and was pulled by a team of mules. We had CCC boys, so we shaped by hand waterways up to 30 feet wide and as much as a half-mile long. We attacked the gully problem with various tools. First we went in and built brush-dams to serve as sediment traps at the bottom of the gullies. We used dynamite in some instances to blow in the gully banks and then planted trees and other cover: kudzu, lovegrass, or honeysuckle. Sometimes we used concrete for small structures, mixing it by hand with shovels and pulling it in wheelbarrows. A man was pretty much on his own; there were no technical guides and everything was experimental.

Naylor: Those were interesting days, those old project days when we were trying practices. It was a real experience to me, because things were tried and found wanting that some people are still proposing today.

Munch: It's a wonder they didn't throw us off the farm, we were trying so many things.

Was it hard to convince farmers to try these new practices?

Naylor: Farmers were reluctant to use them until they were thoroughly proven. So it's a gradual process. Usually your leaders will try these things, and if they prove to be successful, neighbors will try them. People accept practices such as stubble mulching as standard today. Years ago people had doubts about them.

Nelms: Farmers were all for treating the gullies but were slow to let us change their cropland

about. We never did get many farmers to try crop rotation in Mississippi.

How has our program changed?

Moon: The program has expanded tremendously. In our early days, we were taking a "practice" approach; we were an erosion control agency. Now we work on the basis of a complete conservation program and we talk in terms of total resource management systems. That's proven in the way that our programs have expanded. We didn't have any of our resource conservation and development work, watershed work, or river basin studies then. We've improved our techniques and adopted them to present day needs.

Nelms: Almost unbelievable advances in the breadth of our programs and technology have been made. For instance, our program in the Delta area has advanced to the point that we're doing land-forming to completely reshape the land and to rearrange drainage patterns for entire farms.

Munch: The principles of conservation are the same, but now we're working with city people, schools, industries, and real estate developers, who generally don't have the knowledge of and appreciation for the land that farmers have.

Nelms: More Americans are concerned about the environment now. There were people who were concerned about it back then, but they were men whose land and livelihood were being washed out from under them. Today, with improved communications, city people also have an interest in the environment. This has caused us to face up to more improvements that we must make in our programs.

Do the new men in SCS still share the attitudes of the men who founded the agency back in the 1930's?

Munch: We were learning then. And we still are—the new men have the same attitude.

Moon: When I came to the organization, you were looking for a job, and any job you got you were grateful for. I was lucky to get a job with the Soil Conservation Service.

Nelms: The men we hire today are more independent. When they select the Soil Conservation Service it's because they want to, not because they need the job. Accordingly, we are getting fine young men who are particularly interested in the job.

Naylor: Personally, I feel the dedication of people in the Soil Conservation Service continues to be outstanding.

Moon: Our people are better trained now. We're a stronger organization today than we were in those days, to tell the truth.

Contour stripcropping on a farm near Garnavillo, Iowa.





A small pond next to buildings is used for recreation and to test the purity of the water in the Mercer County (N.J.) Soil Conservation District.

What do you consider the most important accomplishments of SCS in the last 40 years?

Moon: The most important accomplishment has been the establishment of conservation measures on the land to maintain our natural resource base and to keep our country productive.

Naylor: We've made the public aware of the soil losses that do affect, in the long run, farm economics. SCS has created this awareness in every county in Kansas.

Nelms: The most beneficial accomplishment here has been the changes in land use. These changes moved crops down into the bottomlands which are more suitable for that use, and put the uplands in grass and trees. This was made possible by improving drainage and flood prevention. These changes began as we put in watershed projects to protect bottomlands. Over a million acres of such land-use adjustments have been made in Mississippi.

Local conservation districts played a large part in these accomplishments, didn't they?

Munch: I think they've had a real impact. They've been a great guide to us here; they've put us on a good basis. The supervisors we've had have helped SCS get our job done, and they've looked ahead of us and got SCS involved in things that later became Service policy.

Moon: Without soil conservation districts, we

would not have had the acceptance necessary to do the job. The farmers have confidence in this system. The fact that district supervisors are local people who don't get paid and are nonpartisan has helped them achieve their acceptance. Because of our close association with this group of people, we were able to gain the acceptance of not only the rural sector, but urban people as well.

What about the future? Where does SCS go from here?

Moon: Where SCS is going is up, up, up! The interest is high, the organization is strong, the needs are *definitely* there, and the acceptance is there because we learned long ago, in the early days, to work with local people. Grassroots people have confidence in our work.

Munch: One thing SCS will have to do is to get more involved in population pressures. The numbers of people have caused many of the joys and pleasures of the outdoors to erode away. We're involved in conservation; without considering population, though, we're not getting down to the nitty-gritty of what should be done.

Nelms: The extent of protection needed for our environment and our natural resource base will continue to increase as we demand pure air and water. We once thought that a 5 ton per acre soil loss was all right because it didn't destroy the field. Now we know that even a 2 ton soil loss will pollute a stream. In this kind of situation it is real hard to say you've ever gotten the job finished.

Moon: There's a lot that remains to be done. There are so many more pressures for different uses of our land and water resources as population grows, that there's an entirely different focus in what we ought to emphasize. We've had to replan, readjust.

Naylor: Times are changing very rapidly; farming techniques are changing; and Service techniques will have to keep abreast of the times.

Munch: One of our strengths is that we have personnel in the field close to the people. Although our duties will vary and grow, I think we'll still be here, doing the job. ♦

An award-winning conservation farm in Brown County, Kansas, includes a terrace system supported by contour farming and a good system of crop rotation. An erosion control dam stabilizes the lower end of the bromegrass waterway.





Bill and Jim Wientjes and author discuss improved range condition after 1 year of deferment on the Wientjes' ranch near Mound City, South Dakota.

Improving Rangeland in South Dakota

by Wayne L. Noble
District conservationist, SCS, Herreid, South Dakota

A drought-proof ranch.

That's what Jim and Bill Wientjes feel they've accomplished on their 3,800-acre ranch in Campbell County, South Dakota.

The two brothers developed a conservation plan with the help of the Soil Conservation Service in 1966 and signed a Great Plains Conservation Program contract the same year. They're both cooperators with the Campbell County Conservation District.

With a goal of improving their rangeland, the brothers started a program of resting pastures. Year-long resting not only improves the vigor of grasses but also gives time for seed production and the establishment of seedlings. "Resting a pasture for the whole growing season is the best improvement practice we have found," Bill Wientjes said.

The Wientjes built four stock dams, laid pipelines to two pastures, developed two springs, and built 1½ miles of cross fence to distribute grazing for proper grassland management. They fenced three dams to improve shoreline vegetation for erosion control and wildlife. They've also established grassed waterways and stripcropping, seeded tame grasses for hay, and planted trees for livestock protection.

"We particularly benefited during the dry year of 1974 with near-normal calf gains," said Jim Wientjes, who is an assistant supervisor with the Campbell County Conservation District.

"We also have less expense keeping a cow by balancing our grass resource. By increasing grass production and adjusting livestock numbers in a dry year, we've helped make this a drought-proof ranch."

In 1972, the two brothers were named "Rangeman of the Year" by the South Dakota Section, Society of Range Management. ♦



Tackling the Shuffling, Shouting Sands

by Noel Marsh
Area range conservationist, SCS, Roswell, New Mexico

When once-peaceful "shifting, whispering" sands begin to shout and dance about, they can attract a great deal of attention and lose their romantic appeal. They begin to threaten farmsteads, highways, and communities and to bury cropland and fences.

Sand dunes build and become activated through disturbance of the natural vegetation which once held these deep sands in place. Source areas often are livestock wells, homesteads, and unsuccessful dryland farms. An active sand dune may advance 50 yards or more a year in a direction with the prevailing strong winds.

This spring in New Mexico, however, Weldon Bauske walked over the former dunes on his ranch in the deep sand country of Roosevelt County. Through technical assistance from the Soil Conservation Service, cost sharing through the Great Plains Conservation Program administered by SCS, and through several years of work and experimenting, he's established a good stand of vegetation on these dunes—a stand that's already stood the test of high winds late in April.

When Bauske, a construction contractor from Clovis, New Mexico, bought his 5-section ranch north of Portales, most of it was Deep Sand and Sand

As is often the case, this sand dune got its start around the livestock well where heavy use disturbed the natural vegetation.

Hills range in good to excellent range condition.

However, he had three sand dune blowout areas that covered about 300 acres. Such areas are not unusual in Roosevelt County. In the early 1940's, many isolated tracts of rangeland were broken out in attempts to raise dryland crops. Many of these attempts were unsuccessful due to climatic hazards, poor farming equipment and techniques, and improper management of the soil and crop residues. The devastating result is that there are an estimated 12,000 to 15,000 acres of blowouts and active duneland in the county today.

Bauske, however, was determined to do something about the active dunes and blowouts. He became a cooperator with the Roosevelt Soil and Water Conservation District and set his objectives to operate both a registered and commercial cow-calf enterprise, improve production, and stabilize and revegetate the dune and blowout areas.

With technical help from the Soil Conservation Service, Bauske developed his conservation plan. His initial decisions included water developments and fencing for better livestock distribution and more intensive management. He planned and followed a grazing system which provided for periodic intensive grazing and growing season rest of the key grasses. The grazing system was coordinated with his livestock breeding and management program.

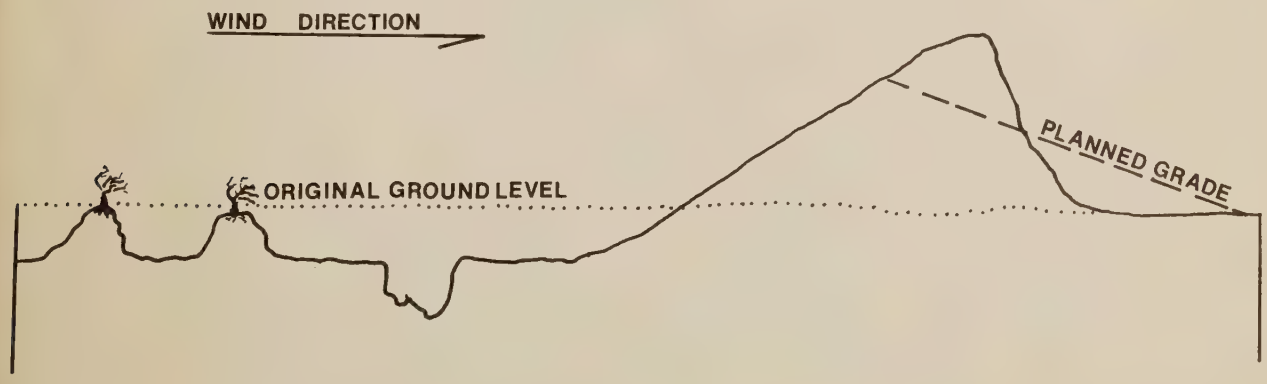
Bauske then tackled his dune areas. While the technology and materials were available to speed up the recovery of dune areas, SCS advised Bauske that costs of the operation usually exceed the value of the rangeland, even after improvement. Bauske's reply was not whether or not to try; but how soon could he get started?

Sand dune blowout areas are referred to as "critical areas" by SCS, meaning that they require special techniques to establish and maintain acceptable vegetative cover.

In the case of these sand dune blowout areas on the high plains of New Mexico, adverse climate, soil, and topography all need to be considered.

Each sand dune blowout area was broken down into three parts based on characteristics and treatments needed to stabilize and revegetate them. These are (1) contributing area, (2) front side of dune, and (3) back side of dune. Each area was first fenced, with sizable areas of native grassland included to provide a continuing natural seed source.

The contributing area is characterized by wind monuments or hummocks, water erosion channels, and an exposed, hard, impermeable subsoil. Treatment calls for general smoothing, knocking down hummocks, and filling in channels. Chisels were used to break the impervious soil crust and then listers were used to furrow these contributing areas at right angles to the direction of prevailing strong winds. This facilitates catching some loose



CROSS SECTION of a sand dune blowout area. At left, the contributing area has wind monuments, water erosion channels, and a hard impermeable subsoil. At right, the sand dune has a relatively gradual slope of sand deposition from the contributing area on the front side of the dune and a relatively steep bank on the back side.



After smoothing the contributing area to the dune, chisels were used to break the impervious soil crust and listers were used to furrow the area at right angles to the direction of prevailing strong winds.

soil and sand in the furrows and the infiltration of moisture into the soil, creating a better environment for plant growth. This practice is best done the fall prior to the summer during which the preparatory cover crop is to be planted.

To treat the front side, or windward slope, of the dune requires little or no grading since it is normally gently sloping and smooth. It is, however, essential to control wind and sand agitation from the contributing areas and to add fertilizer and organic matter in revegetating the front slope. The successful order of treatment is to begin by revegetating the contributing areas, followed by the front slope, and then the back slopes.

Following site preparation on the contributing areas, Bauske planted and fertilized broomcorn to produce adequate residue to protect and provide a home for the perennial grass seedlings the following year.

The cover crop is planted late enough in the season so that a killing frost will prevent seed maturity. This reduces the problem of volunteer competition to the permanent grass seeding the next season. Bauske found broomcorn to be superior to winter wheat as a cover crop because its thicker stalks better withstand strong winter and spring winds.

Bauske chose weeping lovegrass as the permanent cover since stabilization took priority over forage production on these contributing areas. Some weeping lovegrass had been established with the broomcorn, but Bauske seeded between rows into the cover crop the following summer.

On the dune areas themselves, Bauske tried combinations of both cover cropping and manure mulching. Some of the cover crops failed when reverse winds blew sand back over the plantings and buried them. Bauske found that mulching with 20 to 30 tons of feedlot manure per acre on the dune areas achieved superior results and was the most economical since feedlots were nearby.

Mulching with manure also had the advantages of adding organic matter, improving available soil moisture, and avoiding a 1-year delay in planting the perennial grass while waiting for an adequate cover crop.

Bauske seeded a mixture of improved varieties of native grasses on the dune areas—Elida Sand bluestem, Llano indiangrass, Pastura little blue-

stem, and Grenville switchgrass. He added minor amounts of giant dropseed and weeping lovegrass to insure a quick cover.

The small, reclaimed critical area pastures will remain protected from livestock grazing until the end of the second growing season following perennial grass seeding. They can be used for controlled, short period grazing, special purpose pastures, breeding pastures, or incorporated into the overall grazing system. Bauske has made livestock water permanently available to each of the areas.

Bauske believes the results he's experienced are worth the effort. In fact, some formerly doubting neighbors are starting to think about tackling their sands. ♦

On the dune areas themselves, a mixture of improved varieties of native grasses were seeded with minor amounts of giant dropseed and weeping lovegrass.



Recon...

Fewer farmers. A recent survey of directors of soil and water conservation districts in Michigan shows that fewer of the directors are full-time farmers than 5 years ago. According to the Michigan Department of Agriculture's *News & Views*, 66 percent of the current directors are full-time farmers, compared with nearly 80 percent in 1969. Other directors include county and state employees, teachers, bankers, realtors, and retirees. The full-time farmers managed an average of 377 acres each, with 110 reporting dairy and 110 indicating cash crops as the major enterprise. Of Michigan's 425 directors, 418 are male. Average age is about 51—3 years younger than in 1969. Average length of service for directors in Michigan is 7.8 years.

Water users. One out of 10 farms and ranches is irrigated, reports USDA's Economic Research Service (ERS), noting that agriculture is the largest single user of water in the Nation. Specialty crops have a special need for water—to protect against frost and to control high temperatures. Nearly 85 percent of all water consumed is used in rural areas—primarily for agriculture, homes, and industry, ERS noted.

Soil surveys

Kentucky

Daviess and Hancock Counties. By Frank R. Cox, Jr. 1974. Soil Conservation Service in cooperation with Kentucky Agricultural Experiment Station. 108 pp., illus.; maps.

Logan County. By James W. Dye, Arlin J. Barton, and Ronald D. Froedge. 1975. Soil Conservation Service in cooperation with Kentucky Agricultural Experiment Station. 78 pp., illus.; maps.

Pulaski County. By James C. Ross. 1974. Soil Conservation Service and Forest Service in cooperation with Kentucky Agricultural Experiment Station. 121 pp., illus.; maps.

Michigan

Livingston County. By Clarence A. Engberg and Franklin R. Austin. 1974. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station. 92 pp., illus.; maps.

Minnesota

Rice County. By Carroll R. Carlson, Joseph F. Cummins, Russell J. Edwards, Grenfall F. Harms, James J. Murray, Richard E. Rolling, Ronald Severson, and D. Kirk Woodworth. 1975. Soil Conservation Service in cooperation with University of Minnesota Agricultural Experiment Station. 118 pp., illus.; maps.

New Jersey

Hunterdon County. By C. F. Jablonski. 1974. Soil Conservation Service in cooperation with New Jersey Agricultural Experiment Station. 131 pp., illus.; maps.

New Mexico

Valencia County (Eastern Part). By Douglas S. Pease. 1975. Soil Conservation Service and United States Department of the Interior, Bureau of Indian Affairs, in cooperation with New Mexico Agricultural Experiment Station. 121 pp., illus.; maps.

Ohio

Henry County. By Everett C. Flesher, Jr., Kenneth L. Stone, Lloyd K. Young, and Donald R. Urban. 1974. Soil Conservation Service in cooperation with Ohio Department of Natural Resources, Division of Lands and Soil, and Ohio Agricultural Research and Development Center. 128 pp., illus.; maps.

Oklahoma

Alfalfa County. By Glen E. Williams and Edward S. Grover. 1975. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 76 pp., illus.; maps.

Meetings

South Dakota

Mellette County. By E. M. White. 1975 Soil Conservation Service and United States Department of the Interior, Bureau of Indian Affairs, in cooperation with South Dakota Agricultural Experiment Station. 112 pp., illus.; maps.

Sully County. By Gary J. Delaney. 1975. Soil Conservation Service in cooperation with South Dakota Agricultural Experiment Station. 83 pp., illus.; maps.

Texas

Gillespie County. By John E. Allison, Glen W. Dittmar, and James L. Hensell. 1975. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 80 pp., illus.; maps.

Moore County. By Luther C. Geiger. 1975. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 57 pp., illus.; maps.

West Virginia

Fayette and Raleigh Counties. By John L. Gorman and Lester E. Espy. 1975. Soil Conservation Service in cooperation with West Virginia University Agricultural Experiment Station. 76 pp., illus.; maps.

July

3–8 *National Education Association, Los Angeles, Calif.*
13–17 *Seventy-fifth Annual Meeting of American Society of Landscape Architects, San Antonio, Tex.*
19–23 *American Association of Nurserymen, Inc., Chicago, Ill.*
20–24 *National Federation of Business and Professional Women's Clubs, Inc., of the USA, Las Vegas, Nev.*

August

3–6 *National Farm and Power Equipment Dealers Association, Honolulu, Hawaii*
4–8 *American Society of Civil Engineers, Annual Hydraulic Specialty Conference, Seattle, Wash.*
10–13 *American Agricultural Economics Association, Columbus, Ohio*
10–13 *Soil Conservation Society of America, San Antonio, Tex.*
11–13 *American Society of Civil Engineers Watershed Management Symposium, Logan, Utah*
13–15 *American Society of Civil Engineers Irrigation and Drainage Specialty Conference, Logan, Utah*
13–15 *Twenty-Sixth Annual Highway Geology Symposium, Coeur d'Alene, Idaho*
17–22 *American Institute of Biological Science, Corvallis, Oreg.*
17–22 *Ecological Society of America, Corvallis, Oreg.*
24–29 *American Chemical Society, Chicago, Ill.*
24–29 *Joint Annual Meeting of American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America, Knoxville, Tenn.*

September

3–5 *American Water Works Association (Chesapeake Section), Ocean City, Md.*
8–12 *International Association of Game, Fish and Conservation Commissioners, Las Vegas, Nev.*
8–13 *American Fisheries Society, Las Vegas, Nev.*
8–13 *American Horticultural Society Congress, Honolulu, Hawaii*
28–October 2 *National Association County Agricultural Agents, Milwaukee, Wis.*

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

U.S.MAIL

CONTROLLED CIRCULATION POSTAGE
PAID IN WASHINGTON, D.C.
AGR 101

MOVING? Send present mailing label and new address, including zip code, to SOIL CONSERVATION, SCS, U.S. Department of Agriculture, Room 6205, Washington, D.C. 20250.

035
Ay 5

SOIL conservation

FEB 1 '77

INDEX

Issued June 1976
August 1974 to July 1975
Volume 40

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

For sale by the Supt. of Doc. U.S. Government Printing Office, Washington, D.C. 20402
Subscription price $6.85 per year, $8.60 foreign mailing. Index issues vary in price.

SOIL CONSERVATION—INDEX TO VOLUME 40

United States Department of Agriculture
Soil Conservation Service

August 1974 to July 1975

ACT (S)—
Inland Wetlands and Watercourses Act (Conn.). Nov—17
Watershed Protection and Flood Prevention Act (Kans.). Jan—20
Advocacy and the Service. Kenneth E. Grant. Aug—2
Agricultural Research Service—
experimental seeds and cuttings to SCS plant materials center. Sept—5
feedlot waste study. Dec—15
worked on Idaho farmer's irrigation problem. Feb—11
Agricultural Stabilization and Conservation Service—
assisted Sanilac Soil Conservation District (Mich.) with cost-sharing and information program. July—4
assists SCS with LTA's and CPO's in Iowa. Apr—10
ALASKA—
Diversity: A Challenge For Its New Plant Materials Center. Wayne Burleson. June—4
Spuds in Alaska. May—6.
Allen, Dale D.: *A Look at One of the First GPCP Contracts.* May—8
Alverson, Kent A.: *Minnesota State Hospital Boasts 'Community' Outdoor Activities Area.* Dec—19
ARIZONA, plant and wildlife inventory. Feb—7
ARKANSAS, tree "pluglings" raised for distribution. Sept—17
Assunpink Fish and Wildlife Management Area. Feb—4
AWARD(S)—
for advancing environmental education among young people (Va.). Oct—6
youth board (Va.) receives SCSA chapter award. Oct—6
Youth Conservationists of the Year (Va.). Oct—4

Badger, John: *'Conservation Farming Is the Best Therapy We Have Found.'* With Dick Barber. May—16
'Banking' on a Conservation Plan. Frank Jeter, Jr. Dec—10
Barber, Dick—
'Conservation Farming Is the Best Therapy We Have Found.' With John Badger. May—16
New Plantings for the Southwest. With Dan Merkel. Oct—9
Barker, Elmer L.: *What about plastic tubing?* Aug—12
Bauer, Robert: *Receipe for Beef.* June—9
Beachgrass Takes Hold on Canal Spoil. David A. Nash. Dec—6
Beaty, E. R.: *'Dove' Proso Millet—'Strictly for the Birds.'* With John D. Powell, H. J. Haynsworth, and W. C. Young. May—7
Belcher, Cluster R.: *Pines On A High Salt Diet.* With Frederick B. Gaffney. Sept—11
Bell, Arthur L.—
Texas Project Focuses on Plants for Shoreline Erosion Control. With Arnold G. Davis. Mar—16
Vegetating Stream Channels—A Multipurpose Approach. With Edward D. Holcombe and Vernon H. Hicks. Dec—16
Betts, Lynn: *Wet, wild spring in Iowa.* Aug—7
Big Game Hunting at Fort Jackson. Larry Sandifer. Feb—15
Billings, W. H.—
Field Brome—Cover Crop That Copes. Jan—10
Short Course on Erosion Control Offered in Olympia. Sept—9
Blow-out areas on New Mexico ranch. July—19
Bolar, Max D.: *Conservation District Raises 'Pluglings.'* Sept—17
Bond, Robert L.: *Erosion Control At Construction Sites: A Case Study.* Mar—18
Bown, T. A.: *Halifax Maidencane—A Plant To Protect Shorelines.* Apr—7
BOY SCOUT(S)—
plant 25,000 beachgrass plants on a test plot of sterile canal spoil. Dec—6
Tackle Strip-Mined Area: Create 100-Acre Campsite in Wyoming. David C. Graunke. Oct—20
BRUSH—
management (Tex.). May—11
management on cooperative ranch (Wash.). Sept—19
Brushing Up on Wildlife. Curtis C. Cox. May—11
Buckwalter, John C.: *Native Plants Studied in Lake Tahoe Area.* With Jack R. Carlson. Sept—10
Burdick, M. D.: *SCS and the oil shale program.* Aug.—4
Bureau of the Census, statistics of 1974 Census of Agriculture available. Aug—21
Burleson, Wayne: *Alaska's Diversity: A Challenge for Its New Plant Materials Center.* June—4

CALIFORNIA, cover crop plants and better technology aids foothills problems. Aug—15
Campsite erosion control. Mar—15
'Cape' American Beachgrass Anchors Dunes. Frederick B. Gaffney. Sept—20
Carlson, Jack R.: *Native Plants Studied in Lake Tahoe Area.* With John C. Buckwalter. Sept—10
Carr, Delmas E.: *Farming on a Historic Site.* Mar—6
Carter, Erwin. *A Growing Tree Program In Sanilac.* July—4
Cattle poisoning (Mont.) molybdenosis and molybdenum. Apr—19

Center Focuses on Conservation Plants. Diane Rude Foose. Sept—4
Channel restoration (Ind.). Feb—20
Chevelon Canyon—A Plant and Wildlife Inventory Report. Leon Fager and Douglas Immekus. Feb—6
City Saves Its Water Supply. Dennis Grundel. Oct—8
Cole, W. A.: *Shifty Soils In Jackson.* With W. M. Koos. Mar—20
Coleman, Roger: *Land Use Concerns In Mid-America.* Mar—4
COLORADO—
Prototype Oil Shale Leasing Program. Aug—4
Teacher, South Carolina District Receive Top Education Awards at NACD Convention. Jan Curtis and Jerry D. Schwien. Mar—8
'Come to the Farmers Market.' Frank Jeter, Jr. Jan—4
Computer Codes Montana Soil Data. Jack W. Rogers and Dr. Gerald A. Nielsen. Nov—21
Concern For Life. Kenneth E. Grant. Feb—2
CONNECTICUT, Inland Wetlands and Watercourses Act passed in 1972. Nov—17
CONSERVATION—
crop rotation produces better yields (Ohio). June—11
District Raises 'Pluglings.' Max D. Bolar. Sept—17
Editions on the Rise in Kansas. Fred Trump. June—8
Farming Is the Best Therapy We Have Found. John Badger and Dick Barber. May—16
Farming—With A Wildlife Bonus. Sharon Norris. Feb—10
Measures Aid Yankton Sioux. John M. Cross. Sept—6
planning effects (Pa.). Feb—19
Planning on State Game Lands in Pennsylvania. Keith Hinman and Clayton Heiney. Feb—17
Plans of Operation (Iowa). Apr—10
showplace (Del.). Mar—6
With LTA's in Iowa. Bill Willis. Apr—10
Construction sites guideline to minimize erosion and pollution (Pa.). Mar—18
Cooperative Effort Results in Better Plants for Wildlife. Stanley L. Swanson. Dec—20
Cooperative Extension Service—
assists in joint cooperative effort of studying Maine communities. Aug—10
requested to help district organize landowners and support land resources plan (N.Y.). Apr—6
sponsors erosion control short course (Oreg.). Sept—9
Cost-sharing, long term agreements on soil conservation practices (Iowa). Aug—8
COVER CROP(S)—
broomcorn planted in dunes and blowout areas on N. Mex. ranch. July—20
holds sandy soil in place (Tex). May—8
Cox, Curtis C.: *Brushing Up on Wildlife.* May—11
'Creative Conservation' in Fort Union. Kenneth E. Grant. Sept—2
Crop-rotation plan to provide as much farm-grown livestock feed as possible (Pa.). May—15
Cross, John M.: *Conservation Measures Aid Yankton Sioux.* Sept—6
Curtis, Jan—
'A Place They Call Finch Hollow.' Feb—12
Colorado Teacher, South Carolina District Receive Top Education Awards At NACD Convention. With Jerry D. Schwien. Mar—8
Dabelstein, Clint, Minnesota's first conservation district's founding father. Jan—17
DAM(S)—
combining a road and water impounding dam into one structure saves valuable land and improves the road (Mo). Dec—8
Mill Site Dam (Utah) 19,000 acre-feet reservoir. July—8
small earth dams built (Iowa) to save city water supply. Oct—8
supplies 500 million gallons of water (W. Va.). Apr—8
thirty-nine dams planted with materials selected and grown at Knox City PMC (Tex.). Mar—17
twenty-four planned and built dams in South Fork Watershed Project (W. Va.). Dec—8
Davis, Arnold G.: *Texas Project Focuses on Plants for Shoreline Erosion Control.* With Arthur L. Bell. Mar—16
Davis. R. M.: *Grazing Lands: The Pressure Is On.* July—2
Deferred-grazing rotation system (Tex.). June—14
DELAWARE, *Farming on a Historic Site.* Mar—6
Department of Commerce financed water project (W. Va.). Apr—9
Department of the Interior, Bureau of Land Management assists in treatment of federal lands to improve watershed (Utah). July—6
DISTRICT(S)—
Benton County Soil and Water Conservation District helps improve resident wood duck population (Miss.). Feb—8
Black Hawk Soil and Water Conservation District (Iowa) conducted 4-year comprehensive soil survey. June—17
Burns-Homer-Pleasant Soil and Water Conservation District (Minn.). Jan—18
Calcasieu Soil and Water Conservation District provided first sawtooth oaks to local farmers (La.). Aug—9
Canyon Soil and Water Conservation District assists potato plant with study of soil infiltration rates and best adapted types of forage for waste water irrigation system (Idaho). Aug—17
Cass County Soil Conservation District (Iowa). Apr—10
Charles Mix Conservation District cooperates with other agencies to stop silt and washing away of road fill on Indian reservation (S. Dak.). Sept—7
Clarendon Soil and Water Conservation District (S.C.). Feb—21
Connecticut's soil and water conservation districts set up educational programs for wetlands agencies. Nov—17
Cumberland Soil and Water Conservation District assists Portland (Me.) Water District. Nov—10
Douglas Soil Conservation District (Wash.) one of the first to test 'Durar' hard fescue on county highways. Sept—7
Eastern Grand Forks County Soil Conservation District planted trees for windbreak (N. Dak). May—10
Evangeline Soil and Water Conservation District (La.) sponsor three small watershed projects. Oct—18
Evergreen and Skyline Soil and Water Conservation Districts (Va.) difficult manganese mine spoil Aug—19
Foster Creek Conservation District assisted Block 40 Grazing Association (Wash.). Sept—18
Greenville Soil and Water Conservation District wins award for outstanding environmental education program (S.C.). Mar—8
important to SCS in its 40 years of conservation work. July—15
Little River Conservation District (Ark.) raises tree pluglings for plantings around the state. Sept—17

Malheur County Soil and Water Conservation District helps develop farm conservation plan (Oreg.). July—10
Mid-America Association of Conservation Districts (MAACD) solve land use problems (Kans.). Mar—4
Moses Lake Conservation District (Wash.). Sept—18
Multnomah Soil and Water Conservation District (Oreg.). Jan—10
Nicollet Soil and Water Conservation District cooperates in land use and conservation plans (Minn.). Dec—19
Northern Neck Soil and Water Conservation District requests SCS involvement in (Va.) short stabilization. Jan—8
Northern Virginia Soil and Water Conservation District's youth board. Oct—4
Potomac Valley Soil Conservation District assists (W. Va.) farmer with trout pond enterprise and other conservation practices. Dec—7
San Rafael Soil Conservation District (Utah). July—6
Sanilac Soil Conservation District (Mich.) tree planting program. July—4
Tahoe-Verdi Soil Conservation District helps stabilize the soil in Lake Tahoe area. Sept—10
Upper West Fork Soil and Water Conservation District (Tex.). June—14
Wilkes Soil and Water Conservation District helps N.C. bank with conservation measures on gullied, eroded building site. Dec—10
'Dove' Proso Millet—'Strictly for the Birds.' John D. Powell, E. R. Beaty, H. J. Haynsworth, and W. C. Young. May—7
DRAINAGE—
installed but still lacks adequate outlet (N.Y.). Apr—5
precast concrete structures conceived and installed by Ohio contractor-farmer. June—10
underground drains in Wash. Aug—12
Dronen, Sheridan I.: *'Lathco' Flatpea Keeps 'Open Spaces.'* With Robert D. Slayback. Oct—7
'Durar' Hard Fescue: 'Grass of All Trades.' John L. Schwendiman. Sept—8
Dust Bowl days recalled. May—9

ERTS—
Earth Resources Technology Satellite (ERTS) imagery valuable for Mexico's national water study. Nov—18
An ERTS—Based Land Resource Inventory For Mexico's National Water Study. A. A. Klingebiel and Victor I. Myers. Nov—18
Earth Week. Mar—21
ECONOMIC(S)—
dams and conservation practices eliminates costly outlays for Chariton, Iowa. Oct—8
erosion and sediment control measure benefits Sioux tribe (S. Dak). Sept—7
improves in Lincoln Hill RC&D area. Jan—12
'Lana' woollypod vetch contributes to California economy. Sept—5
of Utah area improved and more stable since watershed project. July—9
revenue from (Mich.) tree planting program helps other conservation programs be carried on. July—5
school district saved tremendous amount of money by avoiding costly poor site selections (S.C.). Mar—9
self-sufficient conservation farm (N. Mex.). May—17
use of county youth in conservation projects, worthwhile program at mirimal cost to county. Oct—6
Ecosystem, nature at work in a balanced ecosystem. Feb—11
EDUCATION—
'A Place They Call Finch Hallow.' Feb—12
Adult education program developed in RC&D area (Ind.). Jan—12
Awards program in environmental conservation. Mar—8
family groups, school classes, church and other organizational groups visit exhibit farm each year (Pa.). May—12
outdoor learning center at Minnesota State Hospital. Dec—19
school garden goal develops appreciation of living things and skills needed in planting. Jan—7
school groups benefiting from ecological interpretive center (N.J.) Feb—5
training the mentally handicapped young men (N. Mex.). May—17
tree planting program (Mich.). stirs conservation interest. July—5
Edwards, Johathan P.: *Undaunted . . . They Did Their Own Inventory.* Nov—22
Effect on Man? Apr—19
Elements of Photogrammetry. Paul R. Wolf. Reviewed by Jerome A. Gockowski. Nov—23
"Energy factory" basic interpretive theme of exhibit farm (Pa.). May—16
Environment Protection Agency, noise control standards. Aug—22
ENVIRONMENTAL—
impact of oil shale development (Colo.). Aug—5
Science Center (S.C.) Mar—9
EROSION—
among problems caused by snowmobiles (Minn.). Mar—13
and sediment control model ordinance (Kans.). Mar—5
and sediment survey (N.Y.). Dec—22
brought under control through conservation measures (N.C.). Dec—10
checked with feedlot waste. Dec—15
Control At Construction Sites: A Case Study. Robert L. Bond. Mar—18
control grass controlling shoreline erosion on ponds, lakes, and irrigation reservoirs. (Ark., La., Miss.). Apr—7
control short course (Oreg.). Sept—9
destroying Haiti. Aug—21
of 1935. Apr—21
problem on floodwater retarding dams (Tex.). Mar—16
problems on Block Island (R.I.). May—6
sheet erosion first priority in 1st Minnesota SWCD. Jan—18
slag used for shoreline erosion control (Md.). Aug—22
slopes taken out of production seed to grass (Wash.). Nov—22
Spreading Lespedeza—New Plant For Erosion Problems. Dec—11
Wet, wild spring in Iowa. Aug—7
worse erosion in 25 years (Iowa). Aug—7
Everett, H. Wayne—
Progress in stabilizing manganese mine spoil. Aug—19
'Tryouts' Underway for Plants to Stabilize Surface-Mined Land in Kentucky. With Donald S. Henry. Sept—16
Exchanging Viewpoints. Kenneth E. Grant. Jan—2
Extension Service, with SCS offered unique natural resource service to islanders (R.I.). May—4
Eyes Have It. Kenneth E. Grant. June—2

Fager, Leon: *Chevelon Canyon—A Plant and Wildlife Report.* With Douglas Immekus. Feb—6

Fairfax County Youth Conservation Corps (FCYCC). Oct—5
Fare for the Fishermen. George R. Ways. Dec—7
Farmers Home Administration, financed grazing association's 16,000 acre ranch (Wash.). Sept—18
Farming on a Historic Site. Delmas E. Carr. Mar—6
Ferrying to Work. Gordon S. Smith. May—4
Field Brome—Cover Crop That Copes. W. H. Billings. Jan—10
Field Kit Provides On-the-Spot Solutions. C. M. Thompson, C. L. Girdner, and George Holmgren. Nov—15
Fields, Freddie L.: *'Sleeping Giant' for Spencer.* Apr—8
Finch, Clarence U.: *Green Plants Keep Gold A'Coming From California's Foothills.* With W. Curtis Sharp. Aug—14
Fish and wildlife integral part of channel work (Ind.). Feb—21
FLOOD(S)—
damage checked in Kansas. Jan—20
1.1 million acres of Iowa flooded in spring 1974. Aug—7
Wet, wild spring in Iowa. Aug—7
Yazoo-Little Tallahatchie Flood Prevention Project (Miss.). Feb—9
Foose, Diane Rudd: *Center Focuses on Conservation Plants.* Sept—4
FOREIGN—
An ERTS-Based Land Resource Inventory For Mexico's National Water Study. Nov—18
Soviet Soil Scientists Visit SCS. Nov—7
Forest Service—
assists in treatment of 29,000 acres of federal land (Utah) to improve the watershed. July—6
cooperates with SCS in salt tolerant of pines project. Sept—11
FORESTRY—
Committee responsible for modernizing logging equipment in Indiana RC&D area. Jan—12
snowmobiles destructive in pine plantation or orchard plantation. Mar—14
Forty Years With SCS. July—12
Fulton, Donald H.: *Plant materials and waste management.* Witl Glen L. Nielson. Aug—16

Gaffney, Frederick B.—
'Cape' American Beachgrass Anchors Dunes. Sept—20
Pines On A High Salt Diet. With Cluster R. Belcher. Sept—11
Gahm, Thomas C.: *Minnesota's First Conservation District—And Its Founding Father.* Jan—17
Garrison, Jacob C.: *Re-Creating Early Texas Landscapes.* With Lynn Pace. June—19
Gentry, Charles E.: *Nation's First RC&D Project Marks Its 10th Year.* Jan—11
GEORGIA, spreading virgata lespedeza tested extensively on Ga. highway roadbanks. Dec—11
Girdner, C. L.: *Field Kit Provides On-the-Spot Solutions.* With C. M. Thompson and George Holmgren. Nov—15
Givens, Fred B.: *Stopping the Sea.* With Charles E. Mowry. Jan—8
Gockowski, Jerome A.: Review of *Elements of Photogrammetry.* Nov—23
Good news for Louisiana wildlife. Gene Warren. Aug—9
Grant, Kenneth E.—
Advocacy and the Service. Aug—2
Concern For Life. Feb—2
'Creative Conservation' in Fort Union. Sept—2
Exchanging Viewpoints. Jan—2
Eyes Have It. June—2
Informing, not Dictating. Mar—2
New Opportunities for Women. Apr—2
No Cocoons Around Professions. Oct—2
Public is Concerned. Dec—2
Speeding Up Soil Surveys. Nov—2
Worth Preserving . . . and Talking About. May—2
GRASS(ES)—
'Arriba' western wheatgrass and 'Paloma' Indian ricegrass, high seed production and superior forage production and vigor. Oct—9
bermudagrass used as base grass (Tex.). Mar—17
'Blando' bromegrass used on California's rangeland. Aug—15
'Cape' Amierican Beachgrass Anchors Dunes. Sept—20
'Cape' American beachgrass stabilizes sand dunes along the Chesapeake and Delaware Canal. Dec—6
common reedgrass, giant reedgrass, switchgrass, and prairie cordgrass adapted for controlling wave erosion (Tex.). Mar—17
cropland seeded to grass for livestock enterprise (N. Dak). June—7
'Durar' Hard Fescue: 'Grass of All Trades.' Sept—8
fast cover needed in Lake Tahoe area. Sept—11
'Latar' orchardgrass and creeping meadow foxtail best adapted forage for Idaho plant in using the waste water for irrigation. Aug—17
range seedling major requirement of FmHA financing (Wash.). Sept—19
reed canarygrass seeded on wetland areas (N. Dak.). June—9
seeded on dune areas (N. Mex.). July—20
Stopping the Sea. Jan—9
used on watershed ditchbanks (La.). Oct—18
Grassland improvement program (Tex.). June—14
Grassland of the United States. A Symposium of the American Council. Edited by Howard B. Sprague. Reviewed by Thomas N. Shiflet. Mar—22
Graunke, David C.: *Boy Scouts Tackle Strip-Mined Area; Create 100-Acre Campsite in Wyoming.* Oct—20
Grazing Lands: The Pressure Is On. R. M. Davis. July—2
GPCP—
A Look at One of the First GPCP Contracts. May—8
cost-shared sand dune restoration project on ranch (N. Mex.). July—18
provided SCS plan for brush management on Tex. ranch. June—14
Green Plants Keep Gold A 'Coming From California's Foothills. W. Curtis Sharp and Clearence U. Finch. Aug—14
Green Thumb program (N.Y.) helps with work on outdoor learning center. Feb—13
Growing Tree Program In Sanilac. Erwin Carter. July—4
Grundel, Dennis: *City Saves Its Water Supply.* Oct—8

Halifax Maidencane—A Plant To Protect Shorelines. T. A. Bown. Apr—7
Harrell, Stanton: *Shoreline Erosion Inventory In North Carolina.* Apr—16
Harryman, Robert L.: *Road Washout? Dam It!* With Dwight Snead. Dec—8
Haynesworth, H. J.—
'Dove' Proso Millet—Strictly for the Birds.' With John D. Powell, E. R. Beaty, and W. C. Young. May—7

Spreading Lespedeza—New Plant For Erosion Problems. Dec—11
He Manages His Range 'To Meet Any Emergency.' Allen R. Temanson. June—7
Heiney, Clayton: *Conservation Planning on State Game Lands in Pennsylvania.* With Keith Hinman. Feb—17
Helping small town Maine. Vincent J. Price. Aug—10
Henry, Donald S.: *'Tryouts' Underway for Plants to Stabilize Surface-Mined Land in Kentucky.* With H. Wayne Everett. Sept—16
Herb Society of America plants and cares for herb garden at exhibit farm in Pennsylvania. May—15
Hicks, Vernon H.: *Vegetating Stream Channels—A Multipurpose Approach.* With Arthur L. Bell and Edward D. Holcombe. Dec—16
Highlights—1974 Summary of activities of the Soil Conservation Service for fiscal year 1974. Jan—13
Hill, Jane: *'Trees . . . Play a critical role in processes within the stream itself.'* An Interview With Dr. Robin Vannote. Oct—12
Hinman, Keith: *Conservation Planning on State Game Lands in Pennsylvania.* With Clayton Heiney. Feb—17
Hodgkinson, Harmon S.: *Joint Venture Benefits Ranchers, Range.* Sept—18
Holcombe, Edward D.: *Vegetating Stream Channels—A Multipurpose Approach.* With Arthur L. Bell and Vernon H. Hicks. Dec—16
Holmgren, George: *Field Kit Provides On-the-Spot Solutions.* With C. M. Thompson and C. L. Girdner. Nov—15
Hyer, Russell: *'New Look' in Channel Work.* With James D. McCall. Feb—20

IDAHO—
Conservation Farming—With a Wildlife Bonus. Feb—10
recycling waste water for irrigation. Aug—16
ILLINOIS, Calhoun County with help from RC&D Committee returns wild turkeys to area. Oct—10
Immekus, Douglas: *Chevlon Canyon—A Plant and Wildlife Inventory Report.* With Leon Fager. Feb—6
Improving Rangeland in South Dakota. Wayne L. Noble. July—17
In the Spring of 1935. . . . Apr—21
INDIANA, Lincoln Hills RC&D Project—nation's first. Jan—11
Informing, not Dictating. Kenneth E. Grant. Mar—2
Intergovernmental Personnel Act (IPA). Apr—12
INTERVIEW(S)—
of Dr. Robin Vannote by Jane Hill. *'Trees . . . Play a critical role in processes within the stream itself.'* Oct—12
of Roy A. Welch by Hubert Kelley. *The Meaning of Mosaics.* Sept—13
IOWA—
A City Saves Its Water Supply. Oct—8
long-term agreement program (LTA). Apr—10
method for controlling the spread of urbanization. June—16
Wet, wild spring in Iowa. Aug—7
IPA-Imaginative, Practical Assistance. Verlon K. Vrana. Apr—12
IRRIGATION—
recycling waste water irrigates 850 acres of potato plants (Idaho). Aug—16
treated sewate sludge used to fertilize former strip-mined land (I11.). Aug—21
water carefully managed and applied (Idaho). Feb—11
What about plastic tubing. Aug—12
Jack County's (Tex.) Annual Range Management Day. June—15
Jeter, Frank Jr.—
'Banking' on a Conservation Plan. Dec—10
'Come to the Farmers Market.' Jan—4
Joint Venture Benefits Ranchers, Range. Harmon S. Hodgkinson. Sept—18
Jorgenson, Gerald. *A Western Watershed: 100 Years Later.* July—6
Jupiter Pluvius Checked in Kansas. Fred Trump. Jan—20
'Just Above Everyone Chips In' At Louisiana School Garden. Gene Warren. Jan—7

KANSAS—
award-winning conservation farm. July—16
Conservation Editions on the Rise in Kansas. June—8
flooding damage checked in Kansas. Jan—20
Land Use Concerns in Mid-America. Mar—4
Kelley, Hubert: *The Meaning of Mosaics.* Interview of Dr. Roy A. Welch. Sept—12
Dr. Kellogg Named Honorary Member of International Society of Soil Science. Nov—16
KENTUCKY, legislature acts on surface-mined land problems. Sept—16
Kirby, Robert M.: *Planning for the Land's Sake.* With John G. Scott. Dec—4
Klingebiel, A. A.: *An ERTS-Based Land Resource Inventory For Mexico's National Water Study.* With Victor I. Myers. Nov—18
Koos, W. M.: *Shifty Soils In Jackson.* With W. A. Cole. Mar—20
Kubota, Joe: *The Poisoned Cattle of Willow Creek.* Apr—18

Land management program at Fort Jackson (S.C.). Feb—16
Land resources of the St. Lawrence (N.Y.). Apr—4
LAND USE—
Concerns In Mid-America. Roger Coleman. Mar—4
Control: The Black Hawk County Experience. Louise A. Lex and Louis Lex, Jr. June—16
decisions many in the St. Lawrence Basin. Apr—6
determinations made with SCS assistance on (Wash.) Schneidmiller farm. Nov—22
each acre (Mich.) put to its best use. July—4
Planning for the Land's Sake. Dec—4
policy statement developed (Kans.). Mar—5
reclamation plans to be made before mining begins (Fort Union). Aug—2
symposium held (Kans.). Mar—5
LANDSCAPE(S)—
maintaining and recreating the natural communities of early Tex. June—19
management in conservation. June—2
'Lathco' Flatpea Keeps 'Open Spaces.' Robert D. Slayback and Sheridan I. Dronen. Oct—7
Lavine, David: *A New Role for Connecticut Soil Scientists.* With Edward H. Sautter. Nov—17
Lehnert, Dick: *RC&Ds—Regional organizations solve tough resource* use problems. May—18
Lex, Louis, Jr.: *Land Use Control: The Black Hawk County Experience.* With Louise A. Lex. June—16
Lex, Louise A.: *Land Use Control: The Black Hawk County Experience.* With Louis Lex, Jr. June—16
Livestock, different breeds at exhibit farm (Pa.). May—15

Look at One of the First GPCP Contracts. Dale D. Allen. May—8
LOUISIANA—
acorns for Louisiana wildlife. Aug—9
nature area at state mental hospital. Oct—17
school garden involves students. Jan—7
Watershed Project Sponsors Seed Newly Constructed Ditchbanks. Oct—18
Lund, Martin C.: *'Neighborly' Windbreak.* May—10

McCall, James D.: *'New Look' in Channel Work.* With Russell Hyer. Feb—20
McEwen, Bryce W.: *Soil Survey Helps Protect Water Supply.* Nov—10

MAINE—
community water supply protected. Nov—10
joint effort of the Small Community Planning Team works. Aug—10
Mantell, Leigh D.: *'Second Career' of an Ohio Farmer.* June—10
Marsh, Noel. *Tackling the Shuffling, Shouting Sands.* July—18
MARYLAND, National Plant Materials Center focuses on conservation plants. Sept—4
Meaning of Mosaics. Hubert Kelley interview of D. Roy A. Welch. Sept—12
Merkel, Dan: *New Plantings for the Southwest.* With Dick Barber. Oct—9
Mesquite on Tex. ranch reduced to grow more grass. June—14
MICHIGAN—
A Growing Tree Program in Sanilac. July—4
42 counties within boundaries of operating RC&D projects. May—18
Minimum-tillage stops Iowa soil from washing and blowing. Aug—8
MINING—
Illinois strip-mined land irrigated with treated sewage sludge. Aug—21
land use planning before surface mining begins (Fort Union). Sept—2
plants to stabilize Ky. surface-mined land. Sept—16
Progress in stabilizing manganese mine spoil (Va). Aug—19
SCS and the oil shale program (Colo.). Aug—4
strip-mined area (Wyo). reclaimed as Boy Scout camp. Oct—20
MINNESOTA—
First Conservation District—And Its Founding Father. Thomas C. Gahm. Jan—17
State Hospital Boasts 'Community' Outdoor Activities Area. Kent A. Alverson. Dec—19
outdoor learning center. Dec—19
MISSISSIPPI—
land use plan adopted by Jackson City Council. Mar—20
wood duck nesting boxes erected on floodwater retarding structures and ponds. Feb—8
MISSOURI, *Road Washout? Dam It.* Dec—8
Moybdenum-toxic areas (Mont.). Apr—18
MONTANA, *Computer Codes Montana Soil Data.* Nov—21
'More Than Dams' Is Topic of National Watershed Congress. Mar—23
Morse, Diana: *New Version of Multiflora Rose?* Aug—20
Mowrey, Charles E.: *Stopping the Sea.* With Fred B. Givens, Jr. Jan—8
Myers, Victor I.: *An ERTS-Based Land Resource Inventory For Mexico's National Water Study.* With A. A. Klingebiel. Nov—18

Nance, Earl C.: *Soil Survey and Tax Assessment.* Nov—8
Nash, David A.: *Beachgrass Takes Hold on Canal Spoil.* Dec—6
National Resources Is Program Theme For NSA for 1977. Dec—15
Nation's First RC&D Project Marks Its 10th Year. Charles E. Gentry. Jan—11
Native Plants Studied in Lake Tahoe Area. Jack R. Carlson and John C. Buckwalter. Sept—10
Nature Trail for Ski Tourers. Andrew T. Stewart. Dec—12
'Neighborly' Windbreak. Martin C. Lund. May—10
NEVADA, test area for native plants. Sept—10
New Brochures Answer Questions on Soil Surveys. Nov—9
NEW HAMPSHIRE—
A Nature Trail for Ski Tourers. Dec—12
trial plantings of 'Lathco' flatpea. Oct—7
NEW JERSEY—
plant materials center evaluates salt tolerant pines. Sept—11
Recreational Opportunities in the Assunpink. Feb—4
'New Look' in Channel Work. James D. McCall and Russell Hyer. Feb—20
NEW MEXICO—
conservation farming therapy for mentally handicapped. May—16
establishing vegetation on sand dune areas. July—18
New Opportunities for Women. Kenneth E. Grant. Apr—2
New Plantings for the Southwest. Dan Merkel and Dick Barber. Oct—9
New Role for Connecticut Soil Scientists. David Lavine and Edward H. Sautter. Nov—17
New Version of Multiflora Rose? Diana Morse. Aug—20
NEW YORK—
erosion and sediment survey. Dec—22
Finch Hollow Environmental Education Center. Feb—12
'One of the Last Frontiers of the East.' Apr—4
trial planting of 'Lathco' flatpea. Oct—7
Nielsen, Dr. Gerald A.: *Computer Codes Montana Soil Data.* With Jack W. Rogers. Nov—21
Nielson, Glen L.: *Plant materials and waste management.* With Donald H. Fulton. Aug—16
No Cocoons Around Professions. Kenneth E. Grant. Oct—2
Noble, Wayne L.: *Improving Rangeland in South Dakota.* July—17
Nonfederal Sources Contribute $4.6 Million for Soil Surveys in 1972-73. Nov—7
Norris, Sharon: *Conservation Farming—With a Wildlife Bonus.* Feb—10
NORTH CAROLINA—
district supervisors on general election ballot. Dec—2
gullied bank site made a model of conservation. Dec—10
problems of growth on a "filled" flood plain. Dec—4
Shoreline Erosion Inventory in North Carolina. Apr—16
Watauga County Farmers Market. Jan—4
NORTH DAKOTA—
'Neighborly' Windbreak. May—10
range management on 2,400 acres. June—7

rancher's formula to increase amount of beef he sells. June—9
Norwood, Earl D., Jr.: *Working Together For Waterfowl.* Feb—8
No-till crop production on stony sites. Sept—21

Office of Economic Opportunity, lends expertise in Maine. Aug—10
Ohio Department of Natural Resources, forester worked with farmer in maintaining woodlot. June—11
OHIO, *Second Career of an Ohio Farmer.* June—10
OKLAHOMA, Soil Survey and Tax Assessment. Nov—8
'One of the Last Frontiers of the East.' Vincent J. Price. Apr—4
OREGON—
cover crop to meet specializes crops production need. Jan—10
offers erosion control short course. Sept—9
Planting for Pheasants. July—10
Wildlife Commission wildlife improvements. Dec—20

Pace, Lynn: *Re-Creating Early Texas Landscapes.* With Jacob C. Garrison. June—19
PENNSYLVANIA—
Conservation Planning on State Game Lands in Pennsylvania. Feb—17
ecology of streams in agricultural basins studied. Oct—12
exhibit farm at work. May—12
requires erosion and sedimentation control plans for all earthmoving activities. Mar—18
trial plantings of 'Lathco' flatpea. Oct—7
Pines On A High Salt Diet. Cluster R. Belcher and Frederick B. Gaffney. Sept—11
Place They Call Finch Hollow. Jan Curtis. Feb—12
Planned grazing system on cooperative ranch (Wash.). Sept—19
Planning for the Land's Sake. John G. Scott and Robert M. Kirby. Dec—4
PLANT(S)—
and shrubs rated best for Ky. surface-mined land. Sept—16
'Bandera' Rocky Mountain penstemon, good stabilizer for slopes. Oct—9
'Cardinal' autumn olive. Sept—5
'Emerald' crownvetch. Sept—5
Halifax maidencane. Apr—7
'Latar' orchardgrass. Sept—5
'Lana' woolypod vetch. Sept—5
'Lathco' flatpea. Oct—7
materials and waste management. Donald H. Fulton and Glen L. Nielson. Aug—16
Native Plants Studied in Lake Tahoe Area. Sept—10
'Pink Lady' winterberry euonymus selected for landscape value (N. Mex.). Oct—9
PLANT MATERIALS CENTER(S)—
Americus PMC developed 'Dove' proso millet planting used at military installation (S.C.). Feb—16
Beltsville, Md., center finds new plants or adapts older one to solve conservation problems. Sept—4
"Bud" E. Smith PMC helps maintain and re-create early Tex. landscapes. June—19
Coffeeville (Miss.) PMC studied grass for 10 years. Apr—7
Corvallis PMC helps district with field brome trial plantings (Oreg.). Jan—10
established in Alaska to develop vegetative materials. June—4
Green plants keep gold a'coming from California's foothills. Aug—14
Los Lunas PMC develops plants and planting techniques for erosion control in Southwest. Oct—9
New version of multiflora rose? Aug—20
Planting for Pheasants. S. Duane Town. July—10
Plastic tubing installed on farmland (Wash.). Aug—14
Poisoned Cattle of Willow Creek. Joe Kubota. Apr—18
Pollution, noise control standards proposed. Aug—22
Pond(s), silt holding ponds (Idaho). Feb—11
Powell, John D.: *'Dove' Prosos Millet—'Strictly for the Birds.'* With E. R. Beaty, H. J. Haynsworth, and W. C. Young. May—7
Preacher, James: *Wildlife Refuge In Miniature.* With Lawrence H. Robinson. Feb—21
Preston, James E.: *Spuds in Alaska.* May—6
Price, Vincent J.—
Helping small town Maine. Aug—10
'One of the Last Frontiers of the East.' Apr—4
Seventy-Five Years of the Soil Survey. Nov—4
Snowmobiles The Winter Revolution. Mar—12
Virginia District and Youth Team Up. Oct—4
Prime agricultural land (Iowa). June—16
Prime agricultural land preservation (Kans.). Mar—5
Progress in stabilizing manganese mine spoil. H. Wayne Everett. Aug—19
Public is Concerned. Kenneth E. Grant. Dec—2

RANGE—
management on N. Dak. ranch. June—7
management (Tex.). June—14
Recipe for Beef. Robert Bauer. June—9
Re-Creating Early Texas Landscapes. Jacob C. Garrison and Lynn Pace. June—19
RECREATION—
area at Minnesota State Hospital improves public relations. Dec—19
birdwatching (S.C.). Feb—21
dove, turkey, quail, and big game hunting at Fort Jackson (S.C.). Feb—16
fish-and-pay trout ponds (W. Va.). Dec—7
fishing and camping facilities (Utah). July—8
game hunting in Columbia, S.C. Feb—15
hunter, hiker, photographer, naturalist, or family benefit from Pa. conservation planning on state game lands. Feb—19
hunting for pheasants in Oreg. July—11
on the Rise in Watershed Project. Hans G. Uhlig. June—12
potential inventories updating. Mar—15
skiing nature trail (N.H.). Dec—12
snowmobiles. Mar—14
Recreational Opportunities in the Assunpink. Lawrence H. Robinson. Feb—4
Reference Use. Mar—11
Remote sensing technology aid in Ind. Dec—22
RC&D—
funds used to build six earth dams (Iowa). Oct—8
Little Kanawha Resource Conservation and Development Project (W.Va.). Apr—8
Navajo County Natural Resource Conservation District requested inventory (Ariz.). Feb—7
Nation's First RC&D Project Marks Its 10th Year. Jan—11

New River Resource Conservation and Development project adopts farmers market (N.C.) as active measure. Jan—4
Randall Resource Conservation and Development Project (S. Dak.) helps Yankton Sioux tribe. Sept—7
—*Regional organizations solve tough resource use problems.* Dick Lehnert. May—18
St. John-Aroostook RC&D helps with community planning in small towns in Maine. Aug—10
Two Rivers RC&D Project area helps with turkey project in Ill. Oct—10
Wesmin RC&D project snowmobile trail first completed in nation (Minn.). Mar—15
RIVER BASIN, Eastern N.Y. River Basin Survey. Apr—4
RHODE ISLAND, *Ferrying to Work.* May—4
Road Washout? Dam It! Dwight Snead and Robert L. Harryman. Dec—8
Robinson, Lawrence H.—
Recreational Opportunities in the Assunpink. Feb—4
Wildlife Refuge In Miniature. With James Preacher. Feb—21
Rogers, Jack W.: *Computer Codes Montana Soil Data.* With Dr. Gerald A. Nielsen. Nov—21
Round Hill: An Exhibit Farm at Work. Joseph B. C. White. May—12

Sandifer, Larry: *Big Game Hunting at Fort Jackson.* Feb—15
Santee National Wildlife Refuge (S.C.). Feb—21
Sass, Russell: *Wild Turkeys Return to Illinois County . . . With Help From RC&D Committee.* Oct—10
Sautter, Edward H.: *A New Role for Connecticut Soil Scientists.* With David Lavine. Nov—17
Schwendiman, John L.: *'Durar' Hard Fescue: 'Grass of All Trades.'* Sept—8
Schwien, Jerry D.: *Colorado Teacher, South Carolina District Receive Top Education Awards At NACD Convention.* With Jan Curtis. Mar—8
Science Teachers To See SCS Multimedia Shows. Oct—21
Scott, John G.: Planning for the Land's Sake. With Robert M. Kirby. Dec—4
'Second Career' of an Ohio Farmer. Leigh D. Mantell. June—10
Seventy-Five Years of the Soil Survey. Vincent J. Price. Nov—4
Sewage disposal inadequate (R.I.). May—5
Sharp, W. Curtis: *Green Plants Keep Gold A'Coming From California's Foothills.* With Clarence U. Finch. Aug—14
Shelterbelts to save cattle from winter storms. June—7
Shiflet, Thomas N.: Review of *Grassland of the United States. A Symposium of the American Forage and Grassland Council.* Mar—22
Shifty Soils In Jackson. W. M. Koos and W. A. Cole. Mar—20
Shopper's Guide. Jan—22
Shoreline erosion (N.C.). Apr—16
Shoreline Erosion Inventory In North Carolina. Stanton Harrell. Apr—16
Short Course on Erosion Control Offered in Olympia. W. H. Billings. Sept—9
Siltation threatened Iowa city water supply. Oct—8
Simplot Company, J. R. Operates self-contained waste recycling system (Idaho). Aug—16
Slayback, Robert D.: *'Lathco' Flatpea Keeps 'Open Spaces.'* With Sheridan I. Dronen. Oct—7
'Sleeping Giant' for Spencer. Freddie L. Fields. Apr—8
Smith, Gordon S.: *Ferrying to Work.* May—4
Snead, Dwight: *Road Washout? Dam It!* With Robert L. Harryman. Dec—8
Snowmobiles The Winter Revolution. Vincent J. Price. Mar—12
Snow surveys provided western states by SCS. Mar—12
SOIL CONSERVATION SERVICE—
adminsters watershed projects (Kans.). Jan—20
aids in channel modification with detailed vegetative plan. Dec—16
aids Kans. land use problems with TV programs and spot announcements. Mar—5
and the oil shale program. M. D. Burdick. Aug—4
assembled and studied plants for tolerance to wave action (Tex.). Mar—16
assistance and inventory helping with shoreline erosion problems (N.C.). Apr—16
assistance in Prototype Oil Shale Leasing Program (Colo.). Aug—6
assists district and bank (N.C.) by preparing complete conservation plan for eroded and gullied building site. Dec—10
assists Illinois county in determining suitable habitat area for wild turkey project. Oct—10
assists in developing useful grasses, trees, shrubs, and legumes for (Va.)
manganese mine spoil. Aug—19
assists in development of a Soil Suitability Guide for Land Use Planning (Me.). Nov—10
assists in land use and conservation plans at state hospital (Minn.). Dec—19
assists in planning erosion control short course (Oreg.). Sept—9
assists Indian tribe (S. Dak.) plan and install grade control structure to protect village. Sept—7
assists potato plant (Idaho) with waste water irrigation system. Aug—17
biologist combines natural environment knowledge with local lore to mark nature ski trail (N.H.). Dec—11
developed conservation plan for (N.Y.) outdoor learning center. Feb—13
developed 'Dove' proso millet planted in dove fields (S.C.). Feb—16
developed feed plantings plan for wildlife refuge (S.C.). Feb—21
develops effective cover crop system for orchard and vineyard operations (Calif.). Aug—15
develops soil survey field kit in cooperation with the Hach Chemical Company. Nov—15
enters into Memorandum of Understanding with (Conn.) inland wetland agencies. Nov—17
fact-gathering. Aug—2
fiscal year 1974 summary of activities. Jan—13
formed major part of land use plan (Miss.). Mar—20
forty years in conservation work. July—12
has assigned more employees to work under IPA than any other USDA agency. Apr—12
helped develop a conservation plan for farm of mentally handicapped young men (N. Mex.). May—17
helped develop conservation plan for ranch rangeland improvement. July—17
helped newly formed grazing association (Wash.) Sept—19
helped with planting plan for windbreak (N. Dak.). May—10
helped with school garden project and showed how to prepare soil and prevent erosion and suggested things to plant. Jan—7

helps district in stabilizing soil problem in Lake Tahoe area. Sept—10
Helps Establish Outdoor Nature Area At East Louisiana State Mental Hospital. Gene Warren. Oct—17
helps implement LTA's and CPO's in Iowa. Apr—10
helps transform (Del.) farm into a model of conservation practices. Mar—7
Holds Workshop in Texas For Minority Contractors. May—16
introduces sawtooth oaks in La. Aug—9
Ky. plant materials center works to develop a multiflora rose that will not spread. Aug—20
land use maps, soils information and engineering design and layout assistance provided Boy Scouts in Wyo. Oct—21
marked out strips of brush and forage (Tex.). May—11
measures suggested involved erection and maintainance of artificial wood duck nesting boxes. Feb—8
mosaics "photomaps" of 48 contiguous states and Alaska assembled from satellite images. Sept—12
N.J. plant materials center tests pines for resistance to salt water and salt spray. Sept—11
plant materials center (N.J.) furnish beachgrass plants for Boy Scouts. Dec—6
plant materials specialist discovered and collected 'Cape' American beachgrass for use in dune stabilization. Sept—20
provided engineering and technical help for city in Iowa to save its water supply. Oct—8
provided soils information and some engineering work for N.C. water supply project. Jan—7
provided technical assistance, reviewed plans, and provided inspections during dam construction (W. Va.). Apr—9
provided technical assistance to (N. Mex.) sand country rancher. July—18
provided technical help in survey, design, and construction of Rainbow Farm (W. Va.) trout pond. Dec—7
Quicksand PMC develops plants for economically and effectively stabilizing surface-mined land (Ky.). Sept—16
recognized need and encouraged tree planting (Mich.). July—4
retirees helped set up tree pluglings nursery and constructing of greenhouse (Ark.). Sept—17
revegetation and land rehabilitation of Colorado oil-shale program. Aug—5
shore stabilization in Va. Jan—8
soil scientist assists in implementing North Carolina Sediment Control Act and Wake County Flood Ordinance and works with Wake County comprehensive plan. Dec—4
soil scientists studies use of computers to expedite soil survey programs (Mont.). Nov—21
soil survey data (Okla.) used to appraise land by soil properties. Nov—8
technicians assist (Wash.) farmers tackle urgently needed management decision. Nov—22
2-day annual visit to R.I. to provide conservation assistance to the islanders. May—4
works cooperatively with Small Community Planning Team in Maine. Aug—10
works with Oregon Wildlife Commission to improve wildlife conditions. Dec—20
SCSA Schedules 'Land Use' for August Meeting. Mar—23
SOIL(S)—
A New Role for Connecticut Soil Scientists. Nov—17
data computerized in Montana. Nov—21
high potash and high lime soil (N.Y.). Apr—6
information used in all Pa. state game lands plans. Feb—18
International Society of Soil Science names Dr. Kellogg honorary member. Nov—16
Michigan district completely mapped. July—4
new soil survey field kit speeds up evaluations, mapping accuracy, and field work. Nov—15
nonfederal contributions for soil surveys. Nov—7
Seventy-Five Years of the Soil Survey. Nov—4
Speeding Up Soil Surveys. Nov—2
Survey and Tax Assessment. Earl C. Nance. Nov—8
Survey . . . Buck Stops Here. Nov—12
Survey Helps Protect Water Supply. Bryce W. McEwen. Nov—10
maps and geologic maps evaluated to select likely molybdenum-toxic areas for investigation. Apr—20
survey, maps, interpretation used in RC&D projects (Mich.). May—20
Tour (Ariz.). Sept—21
USDA brochures answers questions of most soil survey users and many common soil survey uses. Nov—9
SOUTH CAROLINA, game management program at Fort Jackson. Feb—15
SOUTH DAKOTA—
drought-proof ranch. July—17
Yankton Sioux Indian Reservation conservation problem. Sept—6
Soviet Soil Scientists Visit SCS. Nov—7
Speeding Up Soil Surveys. Kenneth E. Grant. Nov—2
Spreading Lespedeza—New Plant For Erosion Problems. Harry J. Haynsworth. Dec—11
Spuds in Alaska. James E. Preston. May—6
Stewart, Andrew T.: *A Nature Trail for Ski Tourers.* Dec—12
Stopping the Sea. Charles E. Mowry and Fred B. Givens, Jr. Jan—8
Stroud Water Research Center studies ecology of stream in agricultural basins (Pa.). Oct—12
Summary of Progress, Fiscal Year 1974-SCS. Jan—15
Swanson, Stanley L.: *Cooperative Effort Results in Better Plants for Wildlife.* Dec—20

Tackling the Shuffling, Shouting Sands. Noel Marsh. July—18
Taylor, Moses: *Working Together for Water.* Jan—6
Temanson, Allen R.: *He Manages His Range 'To Meet Any Emergency.'* June—7
TERRACE(S)—
built in Iowa. Apr—11
Grodoni terrace, idea from Italy (Minn.). Jan—19
holds back water on longer slopes (Iowa). Aug—8
TEXAS—
Brushing Up on Wildlife. May—11
18 years after one of nation's first GPCP contracts was signed. May—8
habitat critical for golden-cheeked warbler. Dec—21
holds workshop for minority contractors. May—16
Project Focuses on Plants for Shoreline Erosion Control. Arnold G. Davis and Arthur L. Bell. Mar—16
re-creating early landscapes. June—19
'Tryouts.' Gary Westmoreland. June—14
Vegetating Stream Channels—A Multipurpose Approach. Dec—16
Thompson, C. M.: *Field Kit Provides On-the-Spot Solutions.* With C. L. Girdner and George Holmgren. Nov—15
Town, S. Duane: *Planting for Pheasants.* July—10

TREE(S)—
contest to locate noteworthy trees in Fairfax County (Va.). Oct—6
cover controls erosion, serves as filter strip, wildlife habitat, and for other environmental purposes. Feb—20
European black alder, 'Cardinal' autumn olive, 'Arnot' bristly locust, black locust, and European and Japanese larch survival and growth rates on manganese mine spoil (Va.). Aug—20
for windbreak (N. Dak.). May—10
interview with Dr. Robin Vannote. Oct—12
Pines On A High Salt Diet. Sept—11
planting program in Mich. July—4
. . . Play a Critical Role in Processes Within the Stream Itself—An Interview with Dr. Robin Vannote. Jane Hill. Oct—12
"pluglings" raised for beautification and wildlife on public lands (Ark.). Sept—17
sawtooth oak profitable acorn crop (La.). Aug—9
species showing best survival and growth rates on Ky. surface-mined land. Sept—16
Trump, Fred:
Conservation Editions on the Rise in Kansas. June—8
Jupiter Pluvius Checked in Kansas. Jan—20
'Tryouts' Underway for Plants to Stabilize Surface-Mined Land in Kentucky. H. Wayne Everett and Donald S. Henry. Sept—16
Two-Way Street. Apr—15

Uhlig, Hans G.: *Recreation on the Rise in Watershed Projects.* June—12
Undaunted . . . They Did Their Own Inventory. Jonathan P. Edwards. Nov—22
U.S. Army Corps of Engineers cooperatively developed shore protection practice standard with SCS. Jan—9
U.S. Plant, Soil, and Nutrition Laboratory studies one of the soil-related problems in animal nutrition. Apr—21
UTAH, worked to manage water resource for the last 100 years in Ferron. July—6

Vanote, Dr. Robin: An Interview With Dr. Robin Vannote—*'Trees . . . Play a Critical Role in Processes Within the Stream Itself.'* Jane Hill. Oct—12
Vegetating Stream Channels—A Multipurpose Approach. Arthur L. Bell, Edward D. Holcombe, and Vernon H. Hicks. Dec—16
VIRGINIA—
District and Youth Team Up. Vincent Price. Oct—4
private and public landowners turn to SCS for technical advise needed to stop the sea and protect their land. Jan—8
VISTA, volunteers helps with water supply problems in N.C. Jan—6
Vrana, Verlon K.: IPA=Imaginative, Practical Assistance. Apr—12

Warren, Gene—
Good news for Louisiana wildlife. Aug—9
'Just Abovt Everyone Chips In' At Louisiana School Garden. Jan—7
SCS Helps Establish Outdoor Nature Area At East Louisiana State Mental Hospital. Oct—17
WASHINGTON—
'Durar' hard fescue solves many problems in the state. Sept—8
Joint Venture Benefits Ranchers, Range. Sept—18
plastic tubing solves drainage problems. Aug—12
Schneidmiller brothers made their own resource inventory. Nov—22
Waste management, organic ground. Sept—21
Water developments on cooperative ranch (Wash.). Sept—19
Water project of Entry Mountain community (N.C.). revitalizes area. Jan—7
WATERSHED(S)—
before and after PL-566 in Kans. Jan—20
Crabtree Creek (N.C.) Watershed study. Dec—5
floodwater retarding structure used as an outdoor learning area. Feb—12
investigation reports discovers "one of the last frontiers of the East" (N.Y.). Apr—5
Neshaminy Creek Watershed Site PA-620 (Pa.). Mar—18
project in Ferron, Utah. July—6
project provides recreation development. June—12
Project Sponsors Seed Newly Constructed Ditchbanks. James M. Winston. Oct—18
reservoirs (N.J.) managed as warm water fishery. Feb—5
Squeak Brook studied. Apr—5
Western Watershed: 100 Years Later. July—6
Ways, George R.: *Fare for the Fishermen.* Dec—7
Welch, Dr. Roy A.: *The Meaning of Mosaics.* Interview by Hubert Kelley. Sept—12
WEST VIRGINIA—
shoe factory helps solve employment problems and aids in the improvement of community needs. Jan—6
'Sleeping Giant' for Spencer. Apr—8
trout enterprise attracts public and wildlife. Dec—7
Western Watershed: 100 Years Later. Gerald Jorgenson. July—6
Westmoreland, Gary: *Texas 'Tryouts.'* June—14
Wet, wild spring in Iowa. Lynn Betts. Aug—7
Wetlands, extensive acres (N.Y.). Apr—6
What about plastic tubing? Elmer L. Barker. Aug—12
White, Joseph B. C.: *Round Hill: An Exhibit Farm at Work.* May—12
Who's First. May—9
Wild Turkeys Return to Illinois County . . . With Help From RC&D Committee. Russell Sass. Oct—10
WILDLIFE—
benefits from sawtooth oaks planted on volunteer basis in La. Aug—9
Big Game Hunting at Fort Jackson. Feb—15
birds attracted to windbreak (N. Dak.). May—10
brush pattern techniques provide food and cover (Tex.). May—11
Cooperative Effort Results in Better Plants for Wildlife. Dec—20
development (N.J.) illustrates upland management techniques. Feb—5
disruption by snowmobiles. Mar—13
EPA-TVA to study heated water and fish. Sept—21
fish farm facts. Sept—21
Good news for Louisiana wildlife. Aug—9
habitat critical for rate warbler. Dec—21
habitat planting in conservation plan on therapy farm (N. Mex.). May—17
habitat preservation and replanting areas designated and protected (Ind.). Feb—20

improvement of waterfowl habitat. Feb—8
increases with fertility of the soil. Feb—10
largest migratory mule deer herd in the world (Colo.). Aug—18
plantings and cover for pheasants (Oreg.) July—10
Refuge In Miniature. Lawrence H. Robinson and James Preacher. Feb—21
threatened and endangered species of Chevelon Canyon (Ariz.). Feb—7
Wild Turkeys Return to Illinois County. Oct—10
Willis, Bill: *Conservation With LTA's in Iowa.* Apr—10
Wind Erosion Checked With Feedlot Waste. Dec—15
Windbreak for more comfortable and interesting country homes (N. Dak.). May—10
Winston, James M.: *Watershed Project Sponsors Seed Newly Constructed Ditchbanks.* Oct—18
WISCONSIN, rustic roads law preserves pastoral charm of quiet, tree-lined roads. Aug—21
WOMEN—
first plant sciences technician at National PMC (Md.). Sept—5
New Opportunities for Women. Apr—2
WOODLAND(S)—
areas managed to benefit wildlife (Pa.). Feb—18
17,000 seedlings planted of 14 species of trees and shrubs (Ind.). Feb—20
Working Together for Water. Moses Taylor. Jan—6
Working Together For Waterfowl. Earl D. Norwood, Jr. Feb—8
Worth Preserving . . . and Talking About. Kenneth E. Grant. May—2
WYOMING, Boy Scout camp in strip-mined areas. Oct—20

Yearbook Features 'Shopper's Guide.' Jan—22
Young, W. C.: *'Dove' Proso Millet—'Strictly for the Birds.'* With John D. Powell, E. R. Beaty, and H. J. Haynsworth. May—7
YOUTH—
Board successful in Fairfax County (Va.). Oct—4
Fairfax (Va.) County Youth Conservation Corps (FCYCC). Oct—4

☆U.S. GOVERNMENT PRINTING OFFICE: 1976 O-204-955